1986

SNAP, a Contract Pricing Tool for the Micro-computer

Kris Luella Hoffman
University of Central Florida

S N A P
A CONTRACT PRICING TOOL FOR THE MICROCOMPUTER

BY

KRIS LUELLA HOFFMAN
B.A., Lawrence University, 1979

THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Science in Operations Research
in the Graduate Studies Program of the College of Engineering
University of Central Florida
Orlando, Florida

Summer Term
1986

ABSTRACT

The amount of time required during the contracting process from the solicitation of bids through contract award can be significant. Two of the main problem areas are evaluating the contractor's proposal and completing the negotiation process. The SNAP system was developed to Simplify Negotiations with Automated Pricing using the microcomputer. SNAP can track three separate positions during negotiations and provide hour/dollar summaries for each of these positions by cost account, lot, department, and Work Breakdown Structure (WBS). Evaluation worksheets and department summaries can be produced to provide the evaluators with different perspectives of the same work effort. SNAP will also price the hours/dollars associated with any or all of the positions, with and without burdens, by Contract Line Item Number (CLIN) and/or lot at any time during the negotiation process, allowing the negotiator to compare the negotiated price to the available budget. SNAP makes available to the evaluators and negotiators a variety of reports which, when actively used during the contract evaluation and negotiation process, may achieve additional cost savings as well as decrease the actual amount of time required for negotiations.

ACKNOWLEDGMENTS

I would like to thank the U.S. Army's Project Manager for Training Devices for providing me with the basic knowledge required to complete this thesis, as well as each of the corporations throughout private industry who responded to my survey, giving me more information on which to base my thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

CHAPTER I

BACKGROUND

Many companies/government agencies solicit proposals for the purposes of awarding contracts to qualified, cost competitive bidders. The proposals which are developed by the bidders are composed of a technical section which includes a statement of the work to be done, a manning schedule, a management section describing the techniques and procedures to be applied, and a detailed listing of the work to be done by task with an associated cost and time estimate. (Danhof 1968, p. 160)

Once the proposal is received in response to the Request For Proposal (RFP), it is evaluated by an individual or group of individuals. Since a proposal is not strictly a price evaluation but is a technical evaluation, the evaluation is at least partly a matter of human judgement. (Holtz 1979, p. 83) However, the primary objective in this evaluation is to obtain a price that is "fair and reasonable," while taking into account the technical specifications, quantity, and delivery schedules proposed. (Chandrasekaran 1983, p. 26)

The evaluation effort of the cost and technical specifications is completed at the task level. This effort is difficult because of several complex issues which must

be addressed in the evaluation process. (Sarin 1978, p. 128) The first issue is the existence of multiple evaluation criteria which must all be viewed simultaneously by a single evaluator. This includes criteria such as the technical specification, feasibility of the proposed approach, and price. Each of these criteria must be weighed against the other to develop a single evaluation.

A second issue is the use of multiple evaluators. Two evaluators reviewing the same section of a proposal may develop varying evaluations due to their different intuitive judgements. The most effective means of reducing this problem is to encourage communication among the different evaluators.

The third issue is the lack of detail provided in a proposal which may force the evaluator to make a value judgement regarding the accuracy of the proposed effort.

Once the evaluation of the proposal is complete, contract negotiations can begin. During this process, the solicitor and the bidder are in continuous discussions regarding the justification for each of their respective positions. During this process, each party will alter their position in order to achieve a "fair and reasonable" contract price.

Once a contract price has been agreed to, both negotiators must then justify the negotiated price to top management and/or the public. To do this, adequate

justification must be maintained during the negotiation process to support the final decision. Once management approves the negotiated price, an actual contract is signed.

The amount of time required from solicitation of bids through contract award can be significant. One source (Brown 1984, p. 89) quotes that historically an average of 525 days were required to complete a single contract award. Brown (1984, p. 90) goes on to say that there are four specific problem areas:

1. Reviewing and assessing the case.
2. Awaiting the contractor's initial response.
3. Evaluating the contractor's response.
4. Completing the negotiation process.

This paper addresses two of these problem areas, evaluating the contractor's response and completing the negotiation process, through the use of automated contract evaluation and negotiation pricing tools.

A wide variety of automated contract proposal and negotiation pricing systems exist, but few existing systems actually assist in the contract evaluation and negotiation process or fill the need for a contract negotiation pricing tool which can be relocated and used in any physical location where the contract negotiations may be held.

In this paper a review of the existing contract evaluation and negotiation pricing systems is made. Based on this review, a proposed system to Simplify Negotiations with Automated Pricing (SNAP) is defined, developed, and demonstrated.

CHAPTER II

PROBLEM STATEMENT

Contract proposal and negotiation pricing is presently done in several different ways, some of which are very efficient and effective and some of which are very slow, cumbersome and inaccurate. One of the main problems which has inhibited the development of a generic tool to be used in the pricing of contract proposals and negotiations is the lack of consistency between one contractor/government agency and another in their method of bookkeeping, cost accounting, cost overhead application, cost proposal task breakdown, and various other contract proposal and negotiation pricing techniques. As a result of this inconsistency, several major contractors/government agencies have developed their own automated contract proposal and negotiation pricing tools, unique to their own corporate system. Smaller contractors/government agencies are using the microcomputer spreadsheet technology as an automated means of pricing a single contract proposal/ negotiation. Still other contractors/government agencies presently have no automated means of completing contract proposals and negotiations.

Though the individual automated contract proposal and negotiation pricing tools would appear to be sufficient to

each of the individual contractors/government agencies, the problems arise when one contractor/government agency attempts to complete contract negotiations with yet another contractor/government agency. At this point, there are few available automated tools for completing contract negotiations while tracking the negotiation position of both parties.

SNAP, the automated contract evaluation and negotiation pricing tool developed herein has the ability to track both parties' positions during the negotiation process. Knowledge of both parties positions can give the contract negotiator tracking the process an advantage in knowing exactly where the largest discrepancies lie between the two negotiation positions. This advantage may reduce the amount of time required for negotiations as well as make the opposition vulnerable in not knowing both parties positions at any given moment.

Another advantage of SNAP is that it will allow the contract negotiator(s) to determine and compare the price of the present negotiation position to his/her budget requirements and/or availability at any time.

SNAP has been developed to accommodate a variety of users and their associated pricing techniques. It is designed to increase pricing accuracy over non-automated techniques, operate on a microcomputer to fulfill the requirement of relocation during the contractor/government

agency contract negotiation process, provide a variety of reports to aid the evaluators in the proposal evaluation process, track both parties negotiation positions, and allow changes to be made in either of the parties' positions.

SNAP will provide pricing by lot (that portion of the contract that is to be funded with a given year's dollars), by CLIN (Contract Line Item Number -- the specific deliverable items that are priced separately within a given lot of a contract), and by cost account (labor hours priced with a specific labor rate or material costs). Any discrepancies between the two negotiation positions can be determined at any of the pricing levels specified by cost account.

CHAPTER III

EXISTING PROPOSAL PRICING AND EVALUATION SYSTEMS

Identification

A variety of automated sole-source contract proposal and negotiation pricing systems exist and in order to review as many of them as possible several different mechanisms were used to identify the existing systems. The mechanisms were as follows:

Surveys were sent to seventy-four individuals representing seventy different companies across the United States. The list of companies surveyed was developed through several different sources. Initially, a list of company names was taken from a Contracts Status Listing (U.S. Department of Navy 1985), selecting only those companies with active contracts from 1983 through 1985 valued at greater than $1 million. This resulted in the identification of fifty-seven different companies.

In an attempt to increase the number of companies which would respond to the survey, the names of specific individuals within each of these companies was identified by comparing a list of individuals and their companies attending a training equipment conference (National Security Industrial Association, 1985) to the list of companies. From this list names of individuals and

company addresses were obtained for all of the companies identified on the Contract Status Listing. One individual was selected to receive a survey at each company, and if the company operated in more than one location, separate surveys were sent to individuals at each of the locations.

Further examination of the list of individuals attending the training equipment conference lead to the identification of ten additional companies which are active in the contracting process with large dollar value contracts. Surveys were also sent to individuals at each of these companies.

Conversation with another company (Nelson 1985) lead to the names of three additional contractors which were surveyed. These contractors also were active in contracts valued at greater than $1 million.

The survey, as shown in Figure 1, requested the following information on each automated pricing tool; name of the tool, source, programming language(s) used, computer(s) operating on, primary usage, frequency of use, type of user/system interface, analysis of "user-friendliness," list of primary products/reports generated, any shortcomings/limitations, any improvements/ modifications/substitutions being considered, and if the tool is presently available to the public. Of all of the surveys sent out, twenty were completed and returned. Of the twenty returned, sixteen companies/government agencies

For <u>each</u> automated pricing tool your company/command presently has, please complete a copy of the following two sheets:

1. Pricing Tool Name:_____

2. Source (Inhouse or Vendor Name and Address):_____
_____

3. Program Language(s) Used:_____

4. Computer(s) Utilized On (Name and Size):_____
_____

5. Primary Use Of Pricing Tool (Check All Applicable Items):
_____ Proposal Preparation
_____ Contract Negotiation
_____ Other (Specify):_____

6. Frequency Of Utilization (Check One):
_____ Daily
_____ Weekly
_____ Monthly
_____ Yearly
_____ Not Used

NOTE: If "Not Used" was checked you need answer lines 12 and 13 only.

7. What method of interaction is used with this pricing tool:
_____ Interactive (Immediate Response)
_____ Interactive (Delayed Response)
_____ Not Interactive

8. Would this pricing tool be classified as "user-friendly" (yes or no):_____ Explain:_____
_____
_____

9. List the primary products/reports of this pricing tool (e.g., lot pricing, CLIN pricing, "what-if" drills, etc.), including a short description of each (Attach additional sheets/examples as required):_____
_____
_____
_____
_____
_____

10. List any shortcomings/limitations of this pricing tool (Attach additional sheets/examples as required):_____
_____
_____
_____
_____

11. Are any improvements/modifications/substitutions to this pricing tool being considered? List all such changes and indicate their proposed time frame:_____
_____
_____
_____
_____
_____

12. Is this pricing tool presently available to the public? (yes or no) _____ If so, please indicate how it may be obtained:
_____
_____
_____
_____
_____

NOTE: Line 13 only needs to be addressed if the pricing tool is not presently being utilized.

13. Provide a short narrative indicating why the pricing tool is not used:_____
_____
_____
_____
_____
_____

Figure 1
Survey Form

are presently utilizing automated contract proposal or negotiation pricing tools. Table 1 is a list of the companies responding to the survey, and tables 2 and 3 contain a summary of the information obtained from the sixteen companies/corporations presently utilizing automated pricing tools.

TABLE 1
COMPANIES RESPONDING TO THE SURVEY

COMPANY	AUTOMATED PRICING SYSTEM	SYSTEM NAME
AAI Corp. (2)	Yes	PS92 / Proposal Cost Analysis
American Systems Corp	Yes	WBS and Proposal Costing
Bruning Enterprises, Inc.	No	
Burnside-Ott	Yes	Benchmark Financial Planner
Burtek	Yes	**
Control Data Corporation	Yes	Proposal Costing System
Dynalectron Corporation	Yes	**
Goodyear Aerospace Corp.	Yes	EPS
Gould, Inc.	Yes	Price Data Sheet / Work Statement Generator
Hughes Aircraft	Yes	Corporate Pricing System
Lockheed	Yes	CAPS
Northrop Services, Inc.	Yes	TSIP
RCA Service Co.	Yes	PRICER / IRSP
Sanders Associates, Inc.	Yes	CAPPS
Ship Analytics, Inc. - FL	No	
Ship Analytics, Inc. - CT	Yes	**
The Singer Co.	Yes	**
Systems Research Laboratories,Inc.	No	
Tracor	No	

** Information not provided on the survey response.

TABLE 2: SUMMARY OF CONTRACT PROPOSAL AND/OR NEGOTIATION PRICING SYSTEMS IDENTIFIED BY SURVEY OPERATING ON MAINFRAME COMPUTERS

System Name	Primary* Use(s)	Primary Report(s)	Computer System(s)	Software Language/ Package(s)	System Response	Publicly Available (Y/N)	Comments
Automated Pricing System for Hughes Helicoptar	CM	CLIN pricing by Cost Category	Mainframe	FORTRAN	Delayed	N	Specific to a single contractor.
Computer Aided Proposal Preparation System (CAPPS)	PP	Total Contract Cost Priced Manhours by Labor Rate Costs Burdened and Unburdened	IBM 370	COBOL	Delayed & Immediate	N	Integrated with cost history database. Offers on-line and batch reporting. Capable of "what-ifs"
Computer-Aided Planning System (CAPS)	PP	CLIN/Lot Pricing	IBM 3278 & VAX 11-780	BASIC	Immediate	N	Limited application.
Corporate Pricing System (CPS)	PP	CLIN/Lot Pricing	IBM Mainframe	FORTRAN	Delayed	N	Used for final proposals.
Estimate Processing System (EPS)	PP,CM	CLIN/WBS Cost Summaries Cost Summaries by Month	Sperry Univac 1100	COBOL	Immediate	N	Collects, extends and reports basic estimates.
**	PP,CM	WBS Pricing Manhour spreads By Year/Month Pricing	IBM 3178C	**	**	N	CRT data entry with formatted screens.
PS92	PP	CLIN/Lot/WBS Pricing By Year/Month Pricing	NAS 8020 (IBM 3033 look-alike)	COBOL	Delayed	N	Batch mode for report generation.
TSIP - Financial Control and Processing System	PP,CM,CM	CLIN/WBS Pricing Breakdown by Cost Category Burdened and Unburdened Costs By Month Pricing	IBM 4300	COBOL & BASIC	Immediate	Y	

*CM-Contract Negotiations, PP-Proposal Preparation, CM-Contract Management
** No response provided on the survey to this entry.

TABLE 3: SUMMARY OF CONTRACT PROPOSAL AND/OR NEGOTIATION PRICING SYSTEMS IDENTIFIED BY SURVEY OPERATING ON MICROCOMPUTERS

System Name	Primary* Use(s)	Primary Report(s)	Computer System(s)	Software Language/ Package(s)	System Response	Publicly Available (Y/N)	Comments
Benchmark Financial Planner	PP,CN	CLIN/Lot Pricing Labor Costs	Texas Instruments Professional Computer	Benchmark Financial Planner	Immediate	Y	Requires knowledge of software package.
IRSP	PP	CLIN/Lot Pricing	Wang PC	dBASE III	Immediate	N	Used for small and medium proposals. Doesn't create overheads.
**	PP	Cost Forecasting Labor Pricing	Mackintosh	VISICALC	Immediate	N	Limited use due to proposal uniqueness.
**	PP,CN,CM	CLIN Pricing On-going Contracts Log	IBM PC/AT	LOTUS & BASIC & dBASE III	Immediate	N	Requires knowledge of BASIC.
**	PP	CLIN/Lot Pricing CDRL Tracking	NCR PC	ABASIC dBASE II	Immediate	N	Disk capacity limitation. Planned upgrade to dBASE III.
Price Data Sheet/ Work Statement Generator	PP	Pricing Summaries Hardware and Software Costs	Convergent Technology (CT) 164	FORTRAN	Immediate	N	Disk capacity limitation. Produces hardware/software system block diagram.
Proposal Cost Analysis	PP,CN	CLIN/Lot Pricing	IBM PC/XT	LOTUS	Immediate	N	Not feasible for large proposals.
TSIP - Financial Control and Processing System	PP,CN,CM	CLIN/WBS Pricing Breakdown by Cost Category Burdened and Unburdened Costs By Month Pricing	IBM PC WANG PC	BASIC	Immediate	Y	
WBS and Proposal Costing	PP	CLIN/Lot Pricing CDRL Tracking	IBM XT	dBASE III	Immediate	N	Not menu driven.

*CN-Contract Negotiations, PP-Proposal Preparation, CM-Contract Management
** No response provided on the survey to this entry.

Various comprehensive literature searches were completed through several different sources. These sources include the Southern Technology Applications Center (STAC)[1], the Defense Technical Information Center (DTIC), the University of Central Florida library, and personal contacts working in the contracting field.

An on-line literature search was completed through the STAC to access three different databases; International Software, Compendex (Engineering Information, Inc.), and ABI/Inform (Data Courier, Inc.). The database search of International Software resulted in the identification of two commercially available software packages for completing pricing. Wind-2 Jobcost (Wind-2 Research, Inc.) provided for a very detailed accounting of hours proposed by individual, but no mechanism was provided to include the pricing of material. Solomon III-Job Costing (TLB, Inc.) is developed for the maintenance of a company's general ledger. Neither of these contained a reference to programs capable of entire contract proposal and/or negotiation pricing.

The Compendex search resulted in the identification of the PRICE Software Cost Model (RCA 1984). (Included in Table 4.) The ABI/Inform search identified no automated contract proposal and/or negotiation pricing tools.

---

[1]This search was completed through the University of Central Florida - STAC by Dr. A. Pozefsky, Director.

TABLE 4: SUMMARY OF CONTRACT PROPOSAL AND/OR NEGOTIATION PRICING SYSTEMS IDENTIFIED BY RESEARCH OPERATING ON MAINFRAME COMPUTERS

System Name	Primary* Use(s)	Primary Report(s)	Computer System(s)	Software Language/ Package(s)	System Response	Publicly Available (Y/N)	Comments
Cost Proposal Evaluation Program (CPEP)	CN	Rates/Costs by Cost Category WBS Cost (Burdened/Unburdened) Burden/Overhead Summary	Hewlett-Packard 3000	BASIC	Delayed	N	Input required by WBS and labor/material cost category.
Mark III COPPER IMPACT	CN,CN	CLIN/Lot Pricing Breakdown by Cost Category Inflation Indicies	Honeywell & IBM Mainframes	BASIC & FORTRAN	Delayed	Y	Performs various statistical analyses. Input required by WBS and labor/material cost category.
PRICER	PP	Labor Pricing	IBM Mainframe	AP	Delayed	N	For labor/labor-related items only. Very difficult to produce reports. Requires ADP knowledge.

*CN-Contract Negotiations, PP-Proposal Preparation, CN-Contract Management

A second computerized literature search was completed through the Defense Technical Information Center (DTIC) at the Defense Logistics Agency in Alexandria, Virginia. The DTIC search resulted in the identification of the Project Manager for Training Devices' Cost Proposal Evaluation Program (CPEP) (Brouse 1983) listed in Table 4.

A literature search through the University of Central Florida library identified no additional automated contract proposal and/or negotiation pricing tools.

Two other automated contract proposal and/or negotiation pricing tools were identified through telephone queries. The first of these is the Automated Pricing System for Hughes Helicopter developed by the U.S. Army Aviation Systems Command (Gillespie 1984), and the second is the Mark III Contracting Projects Improve Modern Pricing And Cost Techniques (COPPER IMPACT) Proposal Pricing System developed by the General Electric Company (General Electric Company 1979). These systems are both summarized in Table 4.

Description

The descriptions of the contract proposal and/or negotiation pricing systems identified are limited due to the proprietary nature of the various systems developed. Very few of the systems identified are presently available to the public, so the summary of the proprietary systems

identified is limited to the response provided in the surveys.

The contract proposal and/or negotiation pricing systems identified can be separated into two major categories, those operating on mainframe computers (tables 2 and 4), and those operating on microcomputers (Table 3). In reviewing tables 2 and 4, the following advantages and disadvantages best describe the contract proposal and/or negotiation pricing systems presently operating on mainframe computers:

An advantage in using a mainframe based program is that the variety of reports generally available are detailed and many. Required reports such as lot pricing and CLIN (Contract Line Item Number) pricing are available on almost every system identified. More extensive reports, such as WBS (Work Breakdown Structure) pricing, cost breakdowns by labor code, burdened and unburdened prices, manhour spreads, and pricing for a given time frame, are present on some of the more elaborate systems.

One disadvantage in utilizing a mainframe based program for contract pricing is that some systems identified require a certain amount of ADP (Automated Data Processing) knowledge (i.e., programming skill) in order to make the system work accurately. This could make the system inaccessible to the potential user.

A second disadvantage in a mainframe pricing system is that the response time quoted for virtually all of the mainframe systems was "delayed" (i.e., did not provide an immediate response). Those mainframe systems which did provide an immediate response were generally limited in application. This would indicate that although mainframe systems can provide some very elaborate systems (some even forming cost history databases or performing statistical analyses), the trade off for these enhanced capabilities can be response time.

Microcomputer systems, on the other hand, have their own set of characteristics. In reviewing Table 3, the following aspects would best describe advantages and disadvantages of the contract proposal and/or negotiation pricing systems presently operating on microcomputers:

As on the mainframe systems, an advantage is that the basic required reports of lot pricing and CLIN pricing are available on almost every system identified. Any other reports available with any specific system appear to be tailored to the unique needs of the company/government agency that developed the system. Some of the reports identified include a hardware/software cost breakout, cost forecasting, a log of on-going contracts, and a CDRL (Contract Data Requirements List) status listing.

A disadvantage noted in a few of the microcomputer systems identified was that in order to use the system, one

would need to know (or at least be familiar with) the specific software language/package used to complete the contract proposal and/or negotiation pricing process. Further, some systems rely totally on the use of commercially available spreadsheets for all of their pricing capabilities, which requires an operator to access and use the system.

An advantage of the utilization of microcomputers for pricing is that all of the microcomputer systems identified indicated that the response time of their system was immediate.

A disadvantage the microcomputer systems identified was that the proposal size was sometimes limited due to the disk storage limitation. This limitation should diminish with time as mass storage devices for the microcomputers continue to become larger and less expensive.

Other advantages and disadvantages between mainframe and microcomputer contract pricing systems are not readily visible in tables 2 through 4, but are worth noting. The initial investment cost and operating and support costs of a mainframe computer system are more than that of the microcomputer. Further, the microcomputer is portable to virtually any location, can work in a stand-alone mode, or if required, can still link up with a mainframe system for information transfer through the use of modems and phone line connections.

CHAPTER IV

SNAP - A PROPOSED SOLUTION

The Simplify Negotiations with Automated Pricing (SNAP) system was developed using a systematic approach. This approach was used in an attempt to achieve the potential benefits of improved software reliability and quality, reduced software development and maintenance costs, and a system which is more comprehensive and easier to maintain. (Fathi 1985, p. 41) This was done through developing a program specification, quality specification, program design and program test plan, all before initiating the actual coding of the individual modules. With each of these specifications complete, the actual program structure was designed and each of the program modules was coded, tested, and documented.

This chapter contains the information developed for each of the steps in the SNAP development process.

Program Specification

The Simplified Negotiations with Automated Pricing (SNAP) system was developed using the dBASE III PLUS[2]

---

[2] dBASE III PLUS is a database software package produced and copyrighted by Aston-Tate, 2010 Hamilton Ave., Torrance, CA 90502-1319, 1985.

relational database management software package. This system was chosen due to its wide acceptance in the microcomputer environment as demonstrated by its use in the existing pricing systems shown in Table 3, its inherent database management capabilities, its ability to access ASCII data files in a variety of formats, and its immediate portability to any microcomputer on which dBASE III will operate.

Data entry for SNAP is primarily direct input from the console, however, additional information is provided in the User's Manual (Appendix) to allow an experienced dBASE III user to directly transfer any existing ASCII data file into the format required to be directly accessible through the use of this program. All of the data required is maintained in six separate relational database files for a specified contract and lot number.

The operation of this program can be broken down into two topics, data entry/edit and report generation. Looking first at the data entry/edit portion, the data can essentially be separated into topic areas:

(1) Work Breakdown Structure (WBS): Includes the WBS numbers and their associated nomenclatures. A WBS is used to break down a specific contractual effort by component/ task to a variety of levels for pricing purposes. (U.S. Department of Defense 1975) An example of a WBS for a sample contract is shown in Table 5. The WBS numbers

TABLE 5
SAMPLE SYSTEM WBS DATA

WBS NUMBER	WBS NOMENCLATURE
01	Lamp
01.01	Shade
01.02	Base
01.03	Light Bulb
02	Contract Data
02.01	Manufacturing Plan
02.02	Cost Status Report

provided may be aggregated into a higher level WBS number for greater flexibility in pricing by WBS number. As an example, as shown in Table 5, a lamp (WBS number 01) is composed of a shade, base, and light bulb (WBS numbers 01.01, 01.02, and 01.03, respectively), so pricing of WBS number 01 would include all of the lower level WBS numbers and would thus compose the total cost of the lamp.

WBS numbers are alphanumeric with a maximum length of thirty characters. The WBS nomenclature is alphanumeric with a maximum length of fifty characters. No duplicate WBS numbers are permitted in the database, and an error will result prompting the user for reentry if a duplicate entry is attempted.

(2) Contract Line Item Number (CLIN): Includes the CLINs and their associated nomenclatures, and is required to price out a specific contractual effort by CLIN. An example of CLIN data is shown in Table 6. CLINs are alphanumeric with a maximum length of ten characters. The CLIN nomenclature is alphanumeric with a maximum length of

TABLE 6
SAMPLE SYSTEM CLIN DATA

CLIN NUMBER	CLIN NOMENCLATURE
AA0001	Unit 1
AB0001	Manufacturing Plan
AB0002	Cost Status Report

fifty characters. No duplicate CLINs are permitted in the database, and an error will result prompting the user for reentry if a duplicate entry is attempted. Note: CLIN information is optional to the use of this program, but is required to do any CLIN level pricing.

(3) Cost Account (ACCT): Includes both the material and labor cost accounts, their associated nomenclatures, and an hour/dollar designator indicating whether the given cost account represents a dollar (material) account or a labor hour account. The ACCT is required to price out a specific contractual effort. ACCT numbers are alphanumeric and have a maximum length of five characters. No duplicate ACCT numbers are permitted in the database, and an error will result prompting the user for reentry if a duplicate entry is attempted. The ACCT nomenclature is alphanumeric with a maximum length of thirty characters. The hour/dollars designator is a single character, 'D' or 'H', where a 'D' indicates that the ACCT is a dollars account and an 'H' indicates that the ACCT is an hours account. An entry other than a 'D' or 'H' will produce an error message and

request that the user correct the input. An example of the ACCT data is shown in Table 7.

TABLE 7
SAMPLE SYSTEM ACCT DATA

ACCT NUMBER	ACCT NOMENCLATURE	(H)OURS/(D)OLLARS DESIGNATOR
10A	Purchased Parts	D
10B	Subcontractor	D
20A	Electrical Engineering	H
20B	Manufacturing Assembly	H
20C	Packing and Shipping	H

(4) Department (DEPT): Includes all of the departments and their associated nomenclatures, and is required to review a specific contractual effort by DEPT. DEPTs are alphanumeric, and have a maximum field length of ten characters. The DEPT nomenclature is alphanumeric with a maximum length of thirty characters. No duplicate DEPTs are permitted in the database, and an error will result prompting the user for reentry if a duplicate entry is attempted. An example of the DEPT data is shown in Table 8.

TABLE 8
SAMPLE SYSTEM DEPT DATA

DEPT	DEPT NOMENCLATURE
500	Systems Engineering
501	Manufacturing/Distribution
502	Small Purchase

(5) Labor Rates: Includes the actual dollars per hour labor rates (unburdened) for a specific contract and lot by

labor cost account and are used in the actual pricing of the contract. These rates can only be entered once the cost accounts have been entered to ensure that all of the required ACCT numbers have been entered into the ACCT database. The labor rates are numeric with two decimal places, and have a maximum value of $9,999.99 per hour. The default value for a labor hour ACCT number without a specified labor rate will be zero dollars per hour. An example of the labor rates is shown in Table 9.

TABLE 9
SAMPLE SYSTEM LABOR RATES

ACCT NUMBER	ACCT NOMENCLATURE	LABOR RATE
10A	Purchased Parts	N/A
10B	Subcontracts	N/A
20A	Electrical Engineering	32.75
20B	Manufacturing Assembly	22.30
20C	Packing and Shipping	20.60

(6) Burdens: Includes the actual burden rates, their associated nomenclature, and a list of the cost accounts to which the burden rate is to be applied. The burdens are used in the actual pricing of the contract. Burden rates are numeric with four decimal places, and have a maximum value of 99.9999 (i.e., 9999.99%). The default value for a burden rate is zero. The rates can only be entered once the cost accounts have been entered to ensure that all of the required ACCT numbers have been entered into the ACCT

database, and the burden rates are actually entered as percentages.

The burden nomenclature is alphanumeric with a maximum length of thirty characters. Once a burden nomenclature and rate have been entered, the program continues to ask for ACCT numbers to which the burden rate is to be applied, avoiding the need to reenter the burden nomenclature and rate for each ACCT number. No duplicate entries for the burden nomenclature are permitted in the database, and an error will result prompting the user to reenter the data if a duplicate entry is attempted. An example of the burdens data is shown in Table 10.

TABLE 10
SAMPLE SYSTEM BURDEN DATA

BURDEN NOMENCLATURE	BURDEN RATE	BURDEN RATE AS PERCENT	ACCTS APPLIED TO
Engineering Overhead	1.20	120 %	20A
Manufacturing Overhead	.75	75 %	20B,20C
Materiel Overhead	.15	15 %	10A,10B
Profit	.20	20 %	10A,10B,20A 20B,20C

(7) Hours/Dollars by WBS, ACCT, and DEPT: Includes the actual number of hours or dollars (depending upon the ACCT number) proposed, recommended, and/or negotiated for a specific WBS number, ACCT number, and DEPT. More than one entry for a specified WBS number, ACCT number, and DEPT is acceptable, but no data can be entered into this section of the program until the WBS, ACCT, and DEPT data has been

entered. This is so the program can verify that any entries made into this data file are composed of valid WBS, ACCT, and DEPT entries. If an attempt is made to enter a set of hours/dollars with a WBS number, ACCT number, and/or DEPT that is not in its respective database, an error message will appear requiring the user to correct the entry.

The hours/dollars maintained in this file are broken out into non-recurring (i.e., a one-time expense) and recurring (i.e., a repetitive expense), for each of the specific positions (i.e., proposed, recommended, and/or negotiated) being entered. The various positions may be entered individually, or for all three positions simultaneously. The hours/dollars data fields are each integer with a maximum value of 999,999,999,999. The default value for these fields is zero. A sample data entry for this hours/dollars data is shown in Table 11.

TABLE 11
SAMPLE SYSTEM HOURS/DOLLARS DATA

WBS NUMBER : 01.01
ACCT NUMBER: 10A DEPT: 502

Proposed	Non-Recurring:	100
	Recurring:	10
Recommended	Non-Recurring:	70
	Recurring:	10
Negotiated	Non-Recurring:	75
	Recurring:	10

The format used for all of the data fields has been designated to be large enough to accommodate a variety of users (contractor and government) and their respective management and accounting systems. A list of the data fields and their specified formats is shown in Table 12. All textual entries are left justified and converted to upper case to lessen the probability of data inconsistencies.

TABLE 12
PROGRAM FIELDS AND FORMATS

FIELD	(C)HARACTER/ (N)UMERIC	FIELD LENGTH	DECIMALS
WBS Number	C	30	
WBS Nomenclature	C	50	
CLIN	C	10	
CLIN Nomenclature	C	50	
ACCT Number	C	5	
ACCT Nomenclature	C	30	
(H)our/(D)ollar Designator	C	1	
DEPT	C	5	
DEPT Nomenclature	C	30	
Labor Rate	N	6	2
Burden Nomenclature	C	30	
Burden Rate	N	6	4
Proposed Hours/Dollars - NR*	N	12	0
Proposed Hours/Dollars - R*	N	12	0
Recommended Hours/Dollars - NR	N	12	0
Recommended Hours/Dollars - R	N	12	0
Negotiated Hours/Dollars - NR	N	12	0
Negotiated Hours/Dollars - R	N	12	0

* NR - Non-Recurring, R - Recurring

Having addressed each of the data fields being entered and maintained by this program, the next step is to address how they are used in this program, and their interrelationships:

WBS numbers are required for the input of the hours/dollars data, and are also required to do any pricing of a given WBS number. However, if the user does not desire to have the capability of separating the hours/dollars by WBS, he/she has the option of entering a single WBS number for an entire contract and lot, and then entering all of the associated hours/dollars data under that single WBS number. The WBS nomenclature is only required as an entry to be printed on a WBS report and will default to blanks.

CLINs are entirely optional entries, and are only used to do pricing of the hours/dollars data for a specific CLIN. If CLIN pricing is not desired by the user, the CLIN data may be omitted. If CLIN pricing is desired by the user, the CLINs must be entered with the appropriate WBS numbers to allow the hours/dollars data to be rolled up by CLIN. The CLIN nomenclature is only required as an entry to be printed on a CLIN pricing report and will default to blanks.

Cost accounts are required for utilization of the pricing aspects of this program. The cost account is the level at which labor rates and burden rates will be entered for each contract and lot. As such, the cost accounts associate both the labor rates and the burden rates to the applicable portion of the hours/dollars data, and thus allow the computation of all of the pricing information. The ACCT nomenclature is required only to be displayed on

the pricing worksheets for easier reading and will default to blanks.

DEPTs are required for the input of the hours/dollars data, and are also required to do any report generation for a given department. The DEPTs allow the department manager and/or negotiator to compare the total number of manhours proposed for a specified contractual effort and time frame for a single department to the total number of manhours actually available within that department during the same time frame. This may indicate either an additional manning requirement, or that the work effort proposed is overstated. However, if the user does not wish to have the capability of producing reports for a specified DEPT, the user may simply enter a single DEPT for an entire contract and lot, and then enter all of the associated hours/dollars data under that single DEPT. (This is consistent with the utilization of a single WBS number, as described earlier.) The DEPT nomenclature is only required as an entry to be printed out on a DEPT report and will default to blanks.

Labor rates are required for all ACCTs which are labor cost accounts and for which data is included in the hours/dollars by WBS, ACCT, and DEPT file. If a labor rate is not entered for a labor ACCT which is in the hours/dollars file, a rate of zero dollars per hour is used for pricing purposes for hours associated with that ACCT number. Labor

rates can only be entered for ACCTs identified as hour cost accounts (designated with an 'H') within the ACCT file.

Burdens are only required if the user wishes to apply burdens in the pricing of a contract. If no burdens are entered, only those pricing reports which compute the unburdened (i.e., without any overheads applied) price will be available for printing. In listing the ACCTs to which a specific burden rate is to be applied, the ACCTs must be valid entries in the ACCT file, or the specified ACCT number is noted as an error, and the user is requested to correct the entry. The user enters the burden rates as percentages, but they are stored within the database as decimals. The burden nomenclature is required to be displayed on the pricing worksheets for easy identification.

Hours/Dollars are required for doing any pricing or data summarizing with this program. These values serve as the core to the program's pricing and analysis effort, and allow the user to review any or all of the three separate positions (proposed, recommended, and negotiated) at any time. The hours/dollars are broken out into non-recurring and recurring to allow a report to be generated showing the total non-recurring contract price. This report can then be used by the contract negotiator in determining any required termination liability costs (i.e., if a contract is stopped, that which the contractor is liable to pay the

contractee in termination expenses). They are priced through the use of the ACCT numbers, and can be summarized by WBS, CLIN, DEPT, or lot.

SNAP includes the following output reports:

(1) A listing of the WBS, CLIN, ACCT, DEPT, labor rate, or burden database file(s) with the appropriate nomenclature.

(2) Evaluator worksheets for a specified group of WBS numbers listing the proposed non-recurring and recurring hours/dollars by ACCTs and DEPTs, with a blank entry for the evaluator to enter the recommended position for that same entry.

(3) Evaluator worksheets for a specified group of WBS numbers listing the proposed and recommended non-recurring and recurring hours/dollars by ACCTs and DEPTs.

(4) Evaluator worksheets for a specified group of WBS numbers listing the negotiated non-recurring and recurring hours/dollars by ACCTs and DEPTs, with a blank entry for the evaluator to enter the most recent recommended position for that same entry.

(5) Evaluator worksheets for a specified group of WBS numbers listing the proposed, recommended, and negotiated non-recurring and recurring hours/dollars by ACCTs and DEPTs.

(6) A summary of the hours/dollars proposed by ACCT for a specified set of departments or an entire lot, with a

blank position for the evaluator to enter the recommended position for that same entry.

(7) A summary of hours/dollars proposed, recommended, and the difference, by ACCT for a specified set of departments or for the entire lot.

(8) A summary of the hours/dollars negotiated by ACCT for a specified set of departments or an entire lot, with a blank position for the evaluator to enter the most recent recommended position for that same entry.

(9) A summary of hours/dollars proposed, recommended, and negotiated, by ACCT for a specified set of departments or for the entire lot.

(10) A pricing worksheet showing the proposed hours and dollars and labor rates by ACCT, with and without burdens, for a specified set of CLINs or for the entire lot.

(11) A pricing worksheet showing the recommended hours and dollars and labor rates by ACCT, with and without burdens, for a specified set of CLINs or for the entire lot.

(12) A pricing worksheet showing the negotiated hours and dollars and labor rates by ACCT, with and without burdens, for a specified set of CLINs or for the entire lot.

All pricing worksheets show dollar figures rounded off to the nearest dollar. A total contract lot dollar value

up to 999 billion dollars is acceptable. Any values exceeding this amount are printed out on the report with *'s in the fields where the specified data length is exceeded.

All pricing worksheets show the total dollars broken out into non-recurring and recurring dollars, unburdened and burdened.

The program is written to allow the report to be output directly to the printer, or written to a file to be printed later. The output file name is supplied by the user.

Though the program appears to be structured, it is a modular system. A modular design was used to "enhance design clarity, which in turn eases implementation, debugging, testing, documenting, and maintenance." (Fairley 1985, p. 145) The modular design of SNAP will allow any dBASE III programmer to "pull out" a specific section of code and "plug in" a modified version. This will allow the various users to tailor the program to meet their specific requirements.

Quality Specification

The important quality measures of a software program are maintainability, portability, robustness, and reliability. (Gilbert 1983, pp. 105-107) The SNAP system addresses each of these measures as follows:

(1) Maintainability: The design of the SNAP program isolates all portions of the program which interact with each of the separate data files on data entry/edit. In order to do this, screen displays, data entry, data edit, and variable declaration for each data type (e.g., WBS, ACCT, CLIN, etc.) are completed in separate program modules. Each module has a single entry and a single exit, and no program functions are duplicated in more than one module. This minimizes the impact of altering the database file structure during future program modifications.

Each of the reports generated by SNAP is completed by a separate program module. This prevents an error in the generation of one report from affecting the completion of another report. It also allows for the direct substitution of one report module with another, should a report specification change.

(2) Portability: SNAP can operate on an IBM XT and/or IBM AT and any of the IBM compatibles on which dBase III will operate, with a minimum of a ten megabyte disk drive. The actual amount of space required by the program is less than one-half a megabyte, but the associated database files and indices will require varied amounts of disk space, depending on the actual size and complexity of the contract being proposed and/or negotiated. SNAP will run utilizing any operating system (e.g., PC DOS, MS DOS, CPM, etc.) for which a version of dBASE III PLUS or dBRUN can be

purchased, with no program changes. In conjunction with these microcomputers, the program supports the printing of reports on any printer which can print a minimum of 128 characters horizontally which can be driven by the associated microcomputer.

(3) Robustness: All inputs are set up in a "form" format, displaying an entire screen before requiring any data entry. Further, within each module for each data type, a separate sub-menu is provided to allow the user to select any one of a number of functions to be performed on a specified data record.

All data files are indexed by the first field in the file (as a minimum) to allow the user to sequentially walk through any one of the data files in a sorted fashion, despite the order in which the data was actually entered. No multiple entries of the indexed fields are allowed in cross-referenced files. If a multiple entry is attempted, an error will be displayed and a correction requested.

When utilizing SNAP, the title of the module of the program that the user is working with is always displayed on the top of the screen. Further, on the second line of the screen, a four character contract identifier and the lot number serve as a reminder to the user of which contract and lot data he/she is presently entering, editing, and/or reporting from. In the center of the second line, for all data entry/edit modules, the actual

name of the database file being modified is displayed. When a report is being generated, the name of the report is displayed on the screen in the same location. Whenever the user elects to change the contract identifier and/or lot number, the information on the second line of the screen is updated to reflect that change. This is done to minimize confusion for the user in entering, editing, and/or reporting the correct data.

Whenever a specific contract and lot database file is selected for use, SNAP first verifies its existence within the file directory. If the database file is found, it then opens it for use. If the database is not found, a message is sent to the user asking them to verify that this should indeed be a new file. If the user agrees that it should be a new file, a new file is created with the proper structure, and then it is opened for use. If the user indicates that this should not be a new file, a message is presented suggesting possible errors, and the user is returned to the program's main menu.

Whenever two or more database files are used to produce a specified report, the field allowing the files to be relational is strictly monitored during data entry. At data entry, the existence of the actual field in each of the files allowing the information to be cross-referenced is verified. If the field entry is found in the cross-referenced file, then data entry will proceed. However, if

the field entry is not found in the cross-referenced file, an error message is displayed, allowing the user to correct the entry or put the associated field information in the cross-referenced file, whichever is appropriate.

Whenever a report is generated, SNAP first verifies that all of the required data files are located within the active directory. If the files are found, the report is generated. If the files are not found, the report is terminated, and an error message is displayed to the user listing the file(s) what were not located, and the user is returned to the report menu.

When any of multiple entries may be made in response to a screen query, the user's response is checked to see if it is valid. If the entry is valid, processing will proceed as requested. If the entry is invalid, an error message is presented to the user denoting an invalid entry, and the user is asked to correct the entry. No default values are assumed for any of the menu selections.

All character data entries are immediately converted to upper case, whether entered in lower or upper case. This ensures uniformity in the printing of reports, as well as allows cross-referencing between files to occur irrespective of the data entry mode.

(4) Reliabilty: Due to the robustness of SNAP, consistent reliability should be achieved. Verification of the existence of the database files required and a complete

listing of the program files required should prevent the program from not functioning. The cross-checking done between relational database files should reduce the likelihood of the program malfunctioning. And finally, the elimination of menu defaults and use of validation routines performed at data entry/edit should reduce the amount of program incorrect functions.

(5) General: SNAP is designed to be simple enough to allow a layman to utilize it for both data entry/edit and report generation, with minimal direction.

Program Design

The SNAP System is a modular designed, structured program. Characteristics of the design are as follows:

Assumptions

The first assumption made is that the contract proposal is broken down into separate sections, whether it is by Work Breakdown Structure (WBS), or by Contract Line Item Number (CLIN). If the proposal is broken down by WBS, it is assumed that the sum of certain WBS number(s) correspond to a specific CLIN. If no breakdown is made within the proposal, the pricing capabilites of this program are limited to total lot pricing only.

The second assumption is that each work effort proposed is related to a specific cost account and department. If no cost account is specified, one will need

to be fabricated for the use of this program. If no department is specified, the entire proposal may be priced within one ficticious department.

The third assumption is that all burden rates are applied directly to the total unburdened dollars associated with a specific cost account. No provisions have been included to apply burden rates to contract dollars resulting from the application of other burden rates.

A fourth assumption is that, during report generation, all of the data placed within each of the data files agrees with the input data. If no entry is found associated with a required data entry, a value of zero (for numeric entries) or blank (for character entries) is assumed.

The final assumption is that all program files and database files are maintained on a minimum of a ten megabyte disk, co-located with dBASE III PLUS or dBRUN. This will allow the program to perform with the minimum response time possible.

General Program Design

Structured programming was used in the SNAP system to reduce the complexity of the program by writing separate program modules which perform defined functions. (Jones 1986, p. 15) The first step in structuring the SNAP program was separating the data entry/edit portion of the programming from the report generation portion. To do this, SNAP initially determines the type of function the

user wishes to perform, whether to enter/edit any of the data files, or to produce a report from the previously entered data. (See Figure 2.) If the user wishes to enter/edit a data file, SNAP asks the user which file he/she wishes to use, and proceeds to that particular section of the program. Once the user has opted to enter/edit a specific data file, he/she is allowed to peruse through the file, reviewing its contents, edit a record, add a record, delete a record, undelete a record, or search for a specific record.

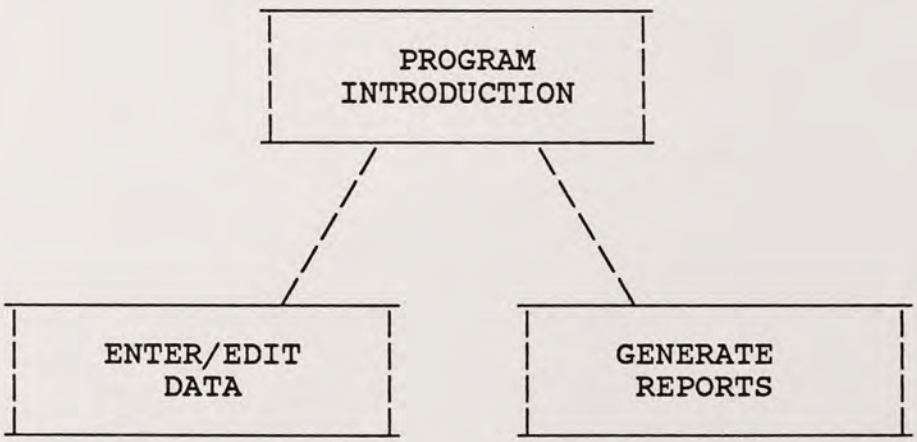


Figure 2

General Program Design

If the user wishes to generate a report, a report menu is presented, and the user may select which report he/she wishes to produce. Once the user has selected the report to be generated, the user is asked if the report should be written to a file on the disk or to a printer. If it is

written to disk, a file name is requested and a new file is created. If the user supplied file name is already present on the disk, the user is given the option of deleting the existing file, or selecting a new file name. If it is directed to the printer, the user is asked if the printer is set up and ready, and upon a positive reply, the report is printed.

Design Features

The structure of the program modules eliminates any duplication of program functions, and isolates all interactive screen commands from any print commands. The design of the interactive modules are such that the seven main data sections (i.e., WBS, CLIN, ACCT, DEPT, Labor Rates, Burdens, and Hours/Dollars) are addressed separately.

In the entering/reviewing of all of the data, the user is provided the opportunity to add/change each of the field values displayed before proceeding to the next screen. Any "incorrect" data (e.g., multiple entry of a single WBS number, CLIN, ACCT number, or DEPT number, invalid responses to menus, etc.) is identified at the time of data entry, and the cursor returns to that particular field and requests that the user reenter the value of that variable. This process is continued until an acceptable value is entered. Further, all character data entered are

immediately converted to upper case characters for processing.

Implementation Concerns

A limiting factor of dBASE III PLUS, which is an implementation concern, is the inability to use arrays, in the typical sense, as memory variables. In lieu of arrays, database files are created and used to capture summations of data required for report generation.

A second implementation concern is the unknown magnitude to which the data files to be used in conjunction with the program may grow. Large data files will have a negative impact on the program response time during report generation, and a faster microcomputer processor may be required to achieve an acceptable response time. The actual response time of all of the reports cannot be directly determined, as it is a function of the size of the database file(s) being accessed.

Program Test Plan

The test plan developed for SNAP includes both bottom-up and top-down testing. (Gilbert 1983)

Top-down specification based testing was used in the generation of the data entry/edit screens for the various data types. By using this technique, the entry/edit routines were written for a specific data type, and tested from the main program by using "stubs" to represent those

program modules not yet written. This testing verified that; (1) each of the modules exercised correctly, (2) unacceptable data entries, as defined in the program specification, were eliminated and the user was provided the opportunity to change the data entry, (3) duplicate entries were not permitted, and (4) the degenerate case of the required database file(s) not being on the disk was identified.

Top-down program-based testing was used upon completion of a program module within the master program. In order to do this, test data was selected, utilizing the program listings, to force the program to exercise every branch and every line of the program module being tested.

Bottom-up testing was used in the testing of the report generation modules. Each report module was first tested independently, and then retested once it was integrated into the main program to be exercised by the report menu.

Program Structure

The Simplify Negotiations with Automated Pricing (SNAP) System consists of a number of program modules and database files which interact to produce an interactive data entry, edit and report generation system. These files are listed in Table 13. Table 14 shows which fields each of the database files contain.

TABLE 13
SNAP PROGRAM MODULE FILE NAMES

Program Modules

SNAP.PRG	FILESLCT.PRG
FILEEXST.PRG	FILEAVAL.PRG
REPORTS.PRG	WBS.PRG
WBSPROC.PRG	CLIN.PRG
CLINPROC.PRG	ACCT.PRG
ACCTPROC.PRG	DEPT.PRG
DEPTPROC.PRG	LABR.PRG
LABRPROC.PRG	BRDN.PRG
BRDNPROC.PRG	LOT.PRG
LOTPROC.PRG	

Report Generation Modules

WBS.RPT	CLIN.RPT
ACCT.RPT	DEPT.RPT
LABR.RPT	BRDN.RPT
LOT.RPT	SUM.RPT
UBDPRICE.RPT	BDPRICE.RPT
PRINT.RPT	FILEEXST.RPT

Database File Structure Files

LOT.DBF	WBS.DBF
CLN.DBF	ACT.DBF
DPT.DBF	BDN.DBF
PRICE.DBF	

A strict naming convention was used in the formation of these files to allow easy identification of problem modules within the program. The file names are broken into segments, the root file name and the file extension (e.g., a file named 'SNAP.PRG' has a root file name of 'SNAP', and an extension of 'PRG'). The root file name relates to the type of data being accessed, and the extension relates to the function the file performs.

TABLE 14
DATA FIELDS AS CONTAINED IN THE DATABASE FILES

FIELD	DATABASE FIELDNAME	DATABASE FILES \W\B\S\	\C\L\N\	\A\C\T\	\D\P\T\	\B\D\N\	\L\O\T\
WBS Number	WBSNUMBER	X					X
WBS Nomenclature	WBSNOMENCL	X					
CLIN	CLINNUMBER	X	X				
CLIN Nomenclature	CLINNOMEN		X				
Cost Account	ACCTNUMBER			X		X	X
Hours/Dollar Designator	ACCTTYPE			X			
Cost Account Nomenclature	ACCTNOMEN			X			
Labor Rate	LABORRATE			X			
Department	DEPTNUMBER				X		X
Department Nomenclature	DEPTNOMEN				X		
Burden Nomenclature	BDNNOMENCL					X	
Burden Rate	BDNRATE					X	
Proposed Hours/Dollars-NR*	PROPNONREC						X
Proposed Hours/Dollars-R*	PROPREC						X
Recommended Hours/Dollars-NR	RECMNONREC						X
Recommended Hours/Dollars-R	RECMREC						X
Negotiated Hours/Dollars-NR	NEGTNONREC						X
Negotiated Hours/Dollars-R	NEGTREC						X

* NR - Non-Recurring, R - Recurring

The specific root file naming convention used for the program and report generation modules in this program is as follows:

SNAP - The main file for the processing of the Simplify Negotiations with Automated Pricing System.

WBS - Relates to the WBS database file for data entry/edit and report generation.

WBSPROC - Contains all of the actual data edit/entry routines for the WBS database file.

LOT - Relates to the LOT database file for data entry/edit and report generation.

LOTPROC - Contains all of the actual data entry/edit routines for the LOT database file.

CLIN - Relates to the CLN database file for data entry/edit and report generation.

CLINPROC - Contains all of the actual data edit/entry routines for the CLN database file.

ACCT - Relates to the ACT database file for data entry/edit and report generation.

ACCTPROC - Contains all of the actual data entry/edit routines for the ACT database file.

DEPT - Relates to the DPT database file for data entry/edit and report generation.

DEPTPROC - Contains all of the actual data edit/entry routines for the DPT database file.

LABR - Relates to the ACT database file for labor rate data entry/edit and report generation.

LABRPROC - Contains all of the actual data entry/edit routines for the labor rates within the ACT database file.

BRDN - Relates to the BDN database file for data entry/edit and report generation.

BRDNPROC - Contains all of the actual data edit/entry routines for the BDN database file.

FILEAVAL - Verifies that all of the files required to run a specified program module are available on the disk.

FILESLCT - Allows the user to select the particular contract and lot that he/she wishes to work with.

FILEEXST - Verifies that the one database file required for data entry/edit or report generation exists on the disk.

REPORTS - Contains the report menu allowing the user to select the reports to be generated.

SUM - Generates the reports which displays a summary of the hours/dollars by ACCT number by lot or by department.

UBDPRICE - Generates the reports which display the unburdened price by ACCT number by lot or by CLIN.

BDPRICE - Generates the reports which display the burdened price by ACCT number by lot or by CLIN.

The specific extension file naming convention used for this program is as follows:

PRG - A command file which may call a number of subprograms to integrate and/or access all of the contract data.

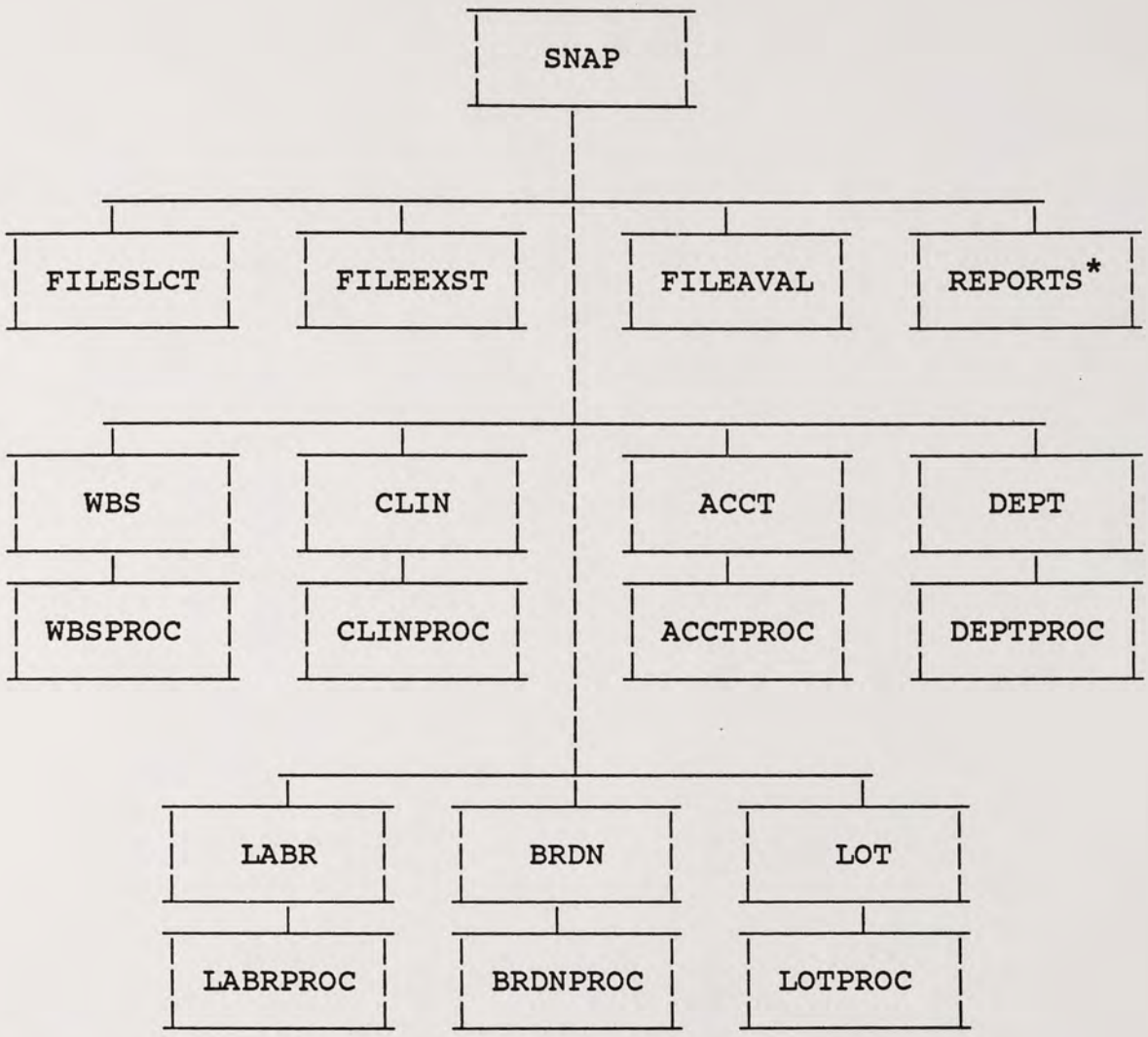
DBF - The actual database file containing the contract and lot information which will be entered, edited, and/or consolidated to complete a report.

NDX - A file which contains the index for the associated database file.

RPT - A program file containing the coding required to produce a specified report.

All of the modules are interrelated to form the SNAP System. The interrelationships of the program modules are depicted in Figure 3. The interrelationships of the report generation modules are shown in Figure 4.

Table 15 was completed to show which data fields are called by which program and report modules. Using tables 14 and 15, someone wanting to change a database field in any way should be able to identify which program modules and database files would need to be reviewed for



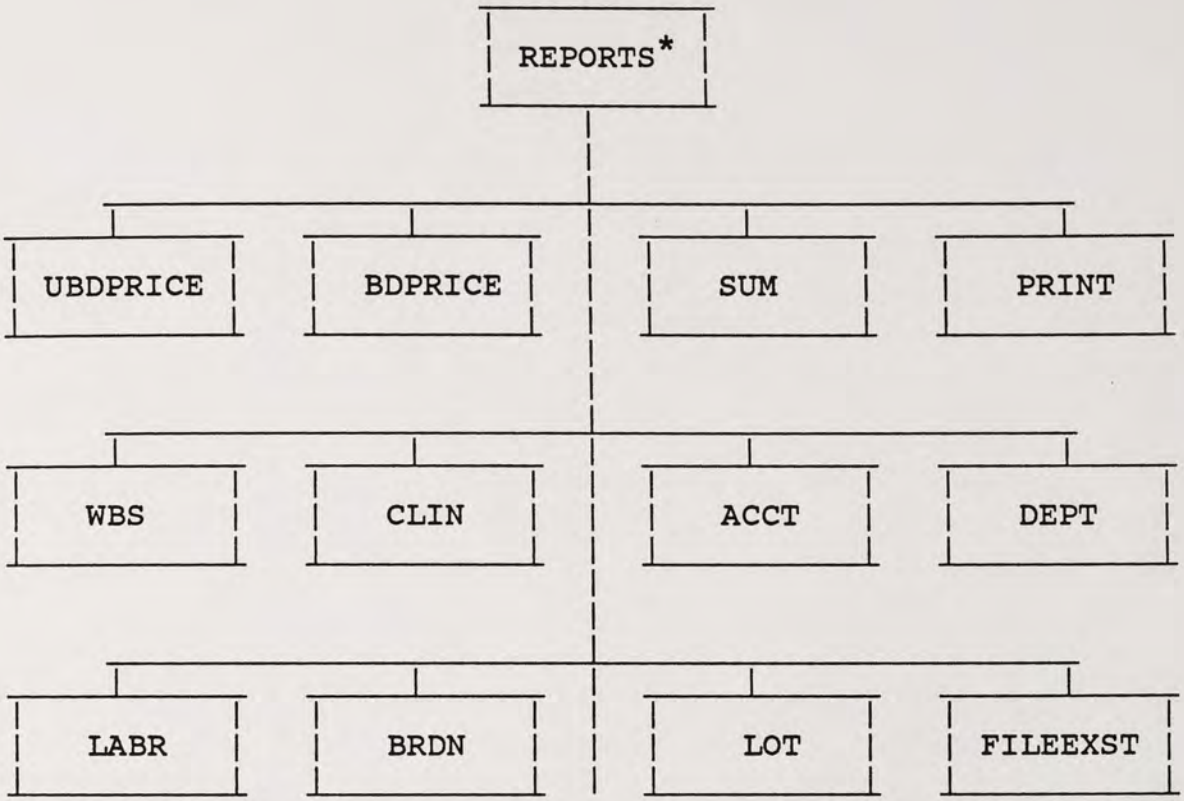
* See Figure 4 for further detail.

Figure 3

Program Module Interrelationships

possible required programming and/or file structure changes.

Table 16 was completed to correlate the module file name with the report selection made from the report menu, remembering that the module will have the file extension



* See Figure 3 for relationship to overall SNAP System.

Figure 4

Report Generation Module Interrelationships

'RPT'. All of the coding required to produce a report is contained within the report module, so if a report format is changed, the corresponding report module can be removed, upgraded, and replaced to incorporate the changes.

Other changes to the SNAP system may be required, and the program module descriptions in the next section, used in conjunction with tables 14, 15 and 16 should help the programmer isolate the affected module(s).

TABLE 15
DATA FIELDS AS CONTAINED IN THE PROGRAM AND REPORT MODULES

PROGRAM MODULE NAMES

DATABASE FIELDNAME	SCNCTCTCRCNCTCEEM	WBSNUMBER	WBSNOMENCL	CLINNUMBER	CLINNOMEN	ACCTNUMBER	ACCTTYPE	ACCTNOMEN	LABORRATE	DEPTNUMBER	DEPTNOMEN	BDNNOMENCL	BDNRATE	PROPNONREC	PROPREC	RECMNONREC	RECMREC	NEGTNONREC	NEGTREC
WBSNUMBER	XX	X	X	X															
WBSNOMENCL	XX	X	X																
CLINNUMBER	XXXX			X	X														
CLINNOMEN	XX			X	X														
ACCTNUMBER	XXXXXXXXXX					X	X	X	X										
ACCTTYPE	XXXXXX					X	X	X	X										
ACCTNOMEN	XXXXXXXX					X	X	X	X										
LABORRATE	XXXX							X	X										
DEPTNUMBER	XXXXXX									X	X								
DEPTNOMEN	XXXX									X	X								
BDNNOMENCL	XXXX											X	X						
BDNRATE	XXXX											X	X						
PROPNONREC	XXXXX													X	X	X	X	X	
PROPREC	XXXXX													X	X	X	X	X	
RECMNONREC	XXXXX													X	X	X	X	X	
RECMREC	XXXXX													X	X	X	X	X	
NEGTNONREC	XXXXX													X	X	X	X	X	
NEGTREC	XXXXX													X	X	X	X	X	

Program Module Descriptions

SNAP.PRG

This program is the master program which initiates the Simplify Negotiations with Automated Pricing (SNAP) System. It is this module that presents the introductory screen

TABLE 16
REPORT GENERATION MODULE NAMES WITH REPORT MENU SELECTIONS

REPORT MODULE NAME	REPORT MENU SELECTION
WBS	Print Out the WBS Database File
CLIN	Print Out the CLIN Database File
ACCT	Print Out the ACCT Number Database File
DEPT	Print Out the DEPT Database File
LABR	Print Out the Labor Rates by Account Number
BRDN	Print Out the Burden Rates Database File
LOT	Evaluator Worksheets for all Hours/Dollars by WBS
SUM	Summary of Hours/Dollars by ACCT Number by Departments or Lot
UBDPRICE	Unburdened Price by ACCT Number by Lot or CLIN
BDPRICE	Total Price (Burdened) by ACCT Number by Lot or CLIN

when the program is executed, as well as the main program menu. It is through this module that all of the other modules are executed.

When the user has finished running SNAP, he/she may elect to return to the operating system, and an exiting message will be displayed to acknowledge a successful program termination through this module.

FILESLCT.PRG

This module, called by SNAP.PRG, is the segment that allows the user to enter the four character contract identifier and the lot number, variables 'CONTRACT' and 'LOT' respectively. These two variables are used to identify the correct database file(s) to be accessed during program execution.

FILEEXST.PRG

This module, called by SNAP.PRG, takes the 'CONTRACT' and 'LOT' variables, in conjunction with a specified database type indicates the database file to be used (e.g., 'WBS' for a Work Breakdown Structure database file), and determines the name of the database file which will be required to complete the specified user request. This resulting file name is stored in the variable 'WORKFILE'. (See the User's Manual, Section II - HELP, File Naming Conventions, for a complete list of names used to specify each of the database file types accessed by this program.)

Once the file name has been determined, this module will then determine whether the 'WORKFILE' exists within the active directory on the disk. If the file exists, the program will execute the next module called. If the file does not exist, an error message is displayed to the user, and based on the user's response, the program will either return to the main program menu, or will reexecute FILESLCT.PRG.

FILEAVAL.PRG

This module, called by SNAP.PRG and REPORTS.PRG, takes the 'CONTRACT' and 'LOT' variables, in conjunction with the specified database type 'DPT', 'ACT', 'WBS', and 'LOT' indicating the Department, Account Number, Work Breakdown Structure, and Hours/Dollars (Proposed, Recommended and/or

Negotiated) files respectively, and determines the names of the database files which must be available to complete the specified user request. It then checks for the existence of each of these files and prints out a message to the user stating the status of each of the files. If all of the files are present, it will proceed on to the next module. If one or more of the files are not found, this module will return the user to the main menu.

WBS.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the WBS number, WBS nomenclature, and associated CLIN. The first function of this module is to determine if an index file exists for the WBS database file. If no index exists, an index is created causing the database entries to be displayed in WBS number sequence. If an index does exist, it is opened for use in the data entry/edit process.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, deleting or undeleting a database record, adding a record, modifying an existing record,

searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These include stepping through the database backwards or forwards, undeleting a record, and returning to the previous menu. All of the remaining menu selections are performed within the WBSPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

WBSPROC.PRG

This module contains the procedures called by the WBS.PRG module which allow the user to add a database record, delete a record, modify a record, or search for a specific record within the database.

CLIN.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the CLIN and CLIN nomenclature. The first function of this module is to determine if an index file exists for the CLN database file. If no index exists, an index is created causing the database entries to be

displayed in CLIN sequence. If an index does exist, it is opened for use in the data entry/edit process.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, deleting or undeleting a database record, adding a record, modifying an existing record, searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These include stepping through the database backwards or forwards, undeleting a record, and returning to the previous menu. All of the remaining menu selections are performed within the CLINPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

CLINPROC.PRG

This module contains the procedures called by the CLIN.PRG module which allow the user to add a database

record, delete a record, modify a record, or search for a specific record within the database.

ACCT.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the ACCT number, ACCT hour/dollar designator, and the ACCT nomenclature. The first function of this module is to determine if an index file exists for the ACT database file. If no index exists, an index is created causing the database entries to be displayed in ACCT number sequence. If an index does exist, it is opened for use in the data entry/edit process.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, deleting or undeleting a database record, adding a record, modifying an existing record, searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These include stepping through the database backwards or forwards, undeleting a record, and returning to the previous menu.

All of the remaining menu selections are performed within the ACCTPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

ACCTPROC.PRG

This module contains the procedures called by the ACCT.PRG module which allow the user to add a database record, delete a record, modify a record, or search for a specific record within the database.

DEPT.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the department and the department nomenclature. The first function of this module is to determine if an index file exists for the DPT database file. If no index exists, an index is created causing the database entries to be displayed in department sequence. If an index does exist, it is opened for use in the data entry/edit process.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the

function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, deleting or undeleting a database record, adding a record, modifying an existing record, searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These include stepping through the database backwards or forwards, undeleting a record, and returning to the previous menu. All of the remaining menu selections are performed within the DEPTPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

DEPTPROC.PRG

This module contains the procedures called by the DEPT.PRG module which allow the user to add a database record, delete a record, modify a record, or search for a specific record within the database.

LABR.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the labor rates by account number.

The first function of this module is to determine if an index file exists for the ACT database file. If no index exists, an index is created causing the database entries to be displayed in ACCT number sequence. If an index does exist, it is opened for use in the data entry/edit process.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, adding the labor rates, modifying the labor rates, searching for a specific record, or returning to the previous menu.

Three of the options presented on this menu are actually performed within this module. These are stepping through the database backwards or forwards, and returning to the previous menu. All of the remaining menu selections are performed within the LABRPROC.PRG file as dBASE III PLUS procedures.

LABRPROC.PRG

This module contains the procedures called by the LABR.PRG module which allow the user to add the labor rates, modify a labor rate, or search for a specific ACCT number within the database.

BRDN.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of the burden nomenclature, burden rates, and applicable account numbers. The first function of this module is to determine if the index file exists for the BDN database file. If the index does not exist, it is created. If the index exists, it is opened for use during the data entry/edit process. The BDN index causes the database entries to be displayed in burden nomenclature sequence.

Next, this module determines if the ACT database file is present on the disk. If it is not found, an error message is displayed to the user, and the user is returned to the main menu. If the ACT database file is found, it then checks for the existence of the index file for the ACT database. If the index does not exist, it is created. The ACT index allows the ACCT number database to be cross-referenced during data entry to verify that any ACCT numbers entered which are to have a burden applied to them are indeed valid entries in the ACT database file. If the index exists, it is opened for use in the data entry/edit process.

The third function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the

function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, viewing the next set of ACCT numbers, deleting a record, adding a record, modifying a record, searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These are stepping through the database backwards or forwards, viewing the next set of ACCT numbers, and returning to the previous menu. All of the remaining menu selections are performed within the BRDNPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

BRDNPROC.PRG

This module contains the procedures called by the BRDN.PRG module which allow the user to add a database record, delete a database record, modify an existing database record, or search for a specific burden nomenclature within the database. Within the procedure which modifies the existing database record, the user may modify the burden nomenclature, modify the burden rate, or modify the existing list of ACCT numbers by adding an ACCT

number, deleting an ACCT number, changing an ACCT number, or undeleting an ACCT number.

LOT.PRG

This module, called by SNAP.PRG, is the control point for data entry/edit of all of the hours/dollars by WBS number, ACCT number, and department. The first function of this module is to determine which of the hour/dollar data types the user wishes to access, whether it be the proposed, recommended, or negotiated hours/dollars, or all three positions. This selection then controls what portions of the database will be available to the user for data entry/edit.

The second function of this module is to display the current record of the database on the screen for the user to review. Along with the current record, it displays a menu of operations from which the user may select the function that he/she desires to perform. This menu includes options for stepping through the database backwards or forwards, deleting or undeleting a database record, adding a record, modifying an existing record, searching for a specific record, or returning to the previous menu.

Four of the options presented on this menu are actually performed within this module. These include stepping through the database backwards or forwards,

undeleting a record, and returning to the previous menu. All of the remaining menu selections are performed within the LOTPROC.PRG file as dBASE III PLUS procedures.

One last remaining function of this module is to ask the user if he/she wishes to permanently delete any database records marked for deletion. Upon a positive reply, the actual deletion of the records and reindexing of the database is completed within this module.

LOTPROC.PRG

This module contains the procedures called by the LOT.PRG module which allow the user to add a database record, delete a record, modify an entire record or a portion of a record, or search for a specific record within the database.

REPORTS.PRG

This module, called by SNAP.PRG, contains the report menu from which the user may select the particular report that he/she wishes to generate. Once a report is selected, the module which contains the commands required to complete the report is called from this module.

FILEEXST.RPT

This module, called by REPORTS.PRG, takes the 'CONTRACT' and 'LOT' variables, in conjunction with a specified database type indicates the database file to be used (e.g., 'WBS' for a Work Breakdown Structure database

file), and determines the name of the database file which will be required to complete the specified user request. This resulting file name is stored in the variable 'WORKFILE'. (See the User's Manual, Section II - HELP, File Naming Conventions, for a complete list of names used to specify each of the database file types accessed by this program.)

Once the file name has been determined, this module will then determine whether the 'WORKFILE' exists within the active directory on the disk. If the file exists, the program will execute the next module called. If the file does not exist, an error message is displayed to the user, and based on the user's response, the program will either return to the program's report menu, or will reexecute FILESLCT.PRG.

PRINT.RPT

This module, called by each of the report generation modules, determines where the user would like to have the report printed, to a file on the disk, or to the attached printer. If the user elects to print the report to a file, this module will ask the user to supply the name of the file it is to be stored in, append the extension '.PRN' to the user supplied file name, and then check to see if the file exists on the disk already. If the file is found, the user is asked if he/she wishes to delete the existing file.

If he/she does wish to delete the file, the file is erased. If the user does not wish to delete the existing file, a new file name is requested.

WBS.RPT

This module is responsible for the generation of the reports which print out the contents of the WBS database file. The first function of this module is to determine if an index file exists for the WBS database file. If an index does not exist, one is created to allow the report to print out the database file in WBS number sequence.

The next function is to determine if the user desires to have the CLINs printed on the WBS database listing report or not. If the user desires to have the CLINs printed on the report, they will be included.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

CLIN.RPT

This module is responsible for the generation of the reports which print out the contents of the CLN database

file. The first function of this module is to determine if an index file exists for the CLIN database file. If an index does not exist, one is created to allow the report to print out the database file in CLIN sequence.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

DEPT.RPT

This module is responsible for the generation of the reports which print out the contents of the DPT database file. The first function of this module is to determine if an index file exists for the DEPT database file. If an index does not exist, one is created to allow the report to print out the database file in department sequence.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the

report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

ACCT.RPT

This module is responsible for the generation of the reports which print out part of the contents of the ACT database file. The first function of this module is to determine if an index file exists for the ACCT database file. If an index does not exist, one is created to allow the report to print out the database file in ACCT number sequence.

The next function is to determine if the user desires to have the hour/dollar designator printed on the ACCT number database listing report or not. If the user desires to have the hour/dollar designator printed on the report, they will be included.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

LABR.RPT

This module is responsible for the generation of the reports which print out labor rates by ACCT number and nomenclature. The first function of this module is to determine if an index file exists for the ACCT database file. If an index does not exist, one is created to allow the report to print out the database file in ACCT number sequence.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

BRDN.RPT

This module is responsible for the generation of the reports which print out burden rates and nomenclatures with the associated ACCT numbers. The first function of this module is to determine if an index file exists for the BRDN database file. If an index does not exist, one is created to allow the report to print out the database file in burden nomenclature and ACCT number sequence.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report

printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

LOT.RPT

This module is responsible for the generation of the reports which print out the evaluator worksheets for all hours/dollars by WBS number. The first function of this module is to determine what range of WBS numbers that the user wishes to have evaluator worksheets printed out for. When the starting and ending WBS numbers are entered, this module immediately verifies that the WBS numbers entered are indeed valid WBS numbers for the contract and lot specified.

Once valid WBS numbers have been entered, the next function of this module is to determine what position(s) the user wishes to have printed on the report (e.g., proposed hours/dollars with a blank position, recommended and proposed hours/dollars, negotiated hours/dollars with a blank position, or proposed, recommended, and negotiated hours/dollars). The position(s) selected by the user is then used throughout the module to control which fields in the database are printed out on the report. All subtotals

and totals displayed on the report are generated within this module.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

SUM.RPT

This module is responsible for the generation of the reports which display a summary of hours/dollars by ACCT number by department or lot. The first function of this module is to determine whether the user wishes to produce the summary for a specified lot, or for a selected set of departments. If the user elects to produce summaries for a specific set of departments, the starting and ending departments are input from the user, and this module immediately verifies that the departments entered are indeed valid departments for the contract and lot specified.

Once valid departments have been entered or the user has elected to produce the report for an entire lot, the next function of this module is to determine what position(s) the user wishes to have printed on the report

(e.g., proposed hours/dollars with a blank position, recommended and proposed hours/dollars with the difference, negotiated hours/dollars with a blank position, or proposed, recommended, and negotiated hours/dollars). The position(s) selected by the user is then used throughout the module to control which fields in the database are summarized in the report.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

UBDPRICE.RPT

This module is responsible for the generation of the reports which display the unburdened price by ACCT number by department or lot. The first function of this module is to determine whether the user wishes to calculate the unburdened price for a specified lot, or for a selected set of Contract Line Item Numbers (CLIN). If the user elects to produce the unburdened price for a specific set of CLINs, this module first verifies that the CLIN database does exist on the disk. If this database is found, the

starting and ending CLINs are input from the user, and this module immediately verifies that the CLINs entered are indeed valid CLINs for the contract and lot specified. If the CLIN database is not found, an error message is displayed, and the user is returned to the report menu.

Once valid CLINs have been entered or the user has elected to produce the report for an entire lot, the next function of this module is to determine what position the user wishes to have printed on the report (e.g., proposed hours/dollars, recommended hours/dollars, or negotiated hours/dollars). The position selected by the user is then used throughout the module to control which fields in the database are used in the report. All of the subtotals, totals, and prices printed on the report are generated within this module.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the user's response, the report is generated, and the output is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

BDPRICE.RPT

This module is responsible for the generation of the reports which display the total (burdened) price by ACCT

number by department or lot. The first function of this module is to determine whether the user wishes to calculate the burdened price for a specified lot, or for a selected set of Contract Line Item Numbers (CLIN). If the user elects to produce the burdened price for a specific set of CLINs, this module first verifies that the CLIN database does exist on the disk. If this database is found, the starting and ending CLINs are input from the user, and this module immediately verifies that the CLINs entered are indeed valid CLINs for the contract and lot specified. If the CLIN database is not found, an error message is displayed, and the user is returned to the report menu.

Once valid CLINs have been entered or the user has elected to produce the report for an entire lot, the next function of this module is to determine what position the user wishes to have printed on the report (e.g., proposed hours/dollars, recommended hours/dollars, or negotiated hours/dollars). The position selected by the user is then used throughout the module to control which fields in the database are used in the report. All of the subtotals, totals, and prices printed on the report are generated within this module.

This module then calls the sub-module PRINT.RPT to determine whether the user desires to have the report printed out on the printer, or stored in a file. Based on the users response, the report is generated, and the output

is either directed to the printer, or is written out to a file with the user supplied file name. Once the report is completed, output is then redirected to the screen, and the report file, if applicable, is closed.

CHAPTER V

SAMPLE RUN

A sample was generated for the purpose of demonstrating the capabilites of the SNAP pricing system. In this sample, the contract identifier of 'TEST' was used with the contract lot number being one. The input data used was purely ficticious, however the subtotals, totals, and prices shown were actually calculated within the report module.

The figures shown on the following pages are the resulting reports generated through the use of SNAP on the sample data set. In reviewing the formats, one can start to see the versatility of this system.

Figures 5 through 8 are samples of the evaluator worksheets generated for each of the four possible report selections. The sample shown in each figure is an excerpt from the entire set of evaluator worksheets generated for the TEST sample contract, lot one.

Figure 5 shows the worksheet generated when the user elects to print out only the proposed position with corresponding blanks. This format can be used to allow the evaluators to pencil in their corresponding recommendation for the proposed hours/dollars for a particular work effort. Once the evaluator has entered the evaluation of

DATE:06/30/86
PAGE: 1

TEST
COST PROPOSAL EVALUATION FORMAT

LOT NO: 1
WBS NO: 01.01
NOMENCLATURE: BASE

ACCT	DEPT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDATION N/R	RECOMMENDATION R
10A	1040	PURCHASE PARTS	100	0		
10A	1040	PURCHASE PARTS	70	0		
10A	1040	PURCHASE PARTS	0	60		
		SUBTOTAL ACCT NO: 10A	170	60		
10C	1040	TOOLING MATERIAL	10522	0		
10C	1040	TOOLING MATERIAL	497	0		
		SUBTOTAL ACCT NO: 10C	11019	0		
20A	1060	SHIPPING	20	0		
		SUBTOTAL ACCT NO: 20A	20	0		
40D	1050	QUALITY CONTROL/INSPECTION	0	3		
		SUBTOTAL ACCT NO: 40D	15	3		
		TOTAL HOURS	285	163		
		TOTAL DOLLARS	11214	60		

Figure 5

Cost Proposal Evaluation Format - Proposed

DATE:06/30/86
PAGE: 1

TEST
COST PROPOSAL EVALUATION FORMAT

LOT NO: 1
WBS NO: 01.01
NOMENCLATURE: BASE

ACCT	DEPT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDED N/R	RECOMMENDED R
10A	1040	PURCHASE PARTS	100	0	70	0
10A	1040	PURCHASE PARTS	70	0	40	30
10A	1040	PURCHASE PARTS	0	60	0	40
		SUBTOTAL ACCT NO: 10A	170	60	110	70
10C	1040	TOOLING MATERIAL	10522	0	10522	0
10C	1040	TOOLING MATERIAL	497	0	450	0
		SUBTOTAL ACCT NO: 10C	11019	0	10972	0
20A	1060	SHIPPING	20	0	15	0
		SUBTOTAL ACCT NO: 20A	20	0	15	0
40D	1050	QUALITY CONTROL/INSPECTION	0	3	0	3
		SUBTOTAL ACCT NO: 40D	15	3	12	3
		TOTAL HOURS	285	163	252	168
		TOTAL DOLLARS	11214	60	11102	70

Figure 6

Cost Proposal Evaluation Format - Proposed and Recommended

DATE:06/30/86
PAGE: 1

TEST
COST PROPOSAL EVALUATION FORMAT

LOT NO: 1
WBS NO: 01.01
NOMENCLATURE: BASE

ACCT	DEPT	DESCRIPTION	NEGOTIATED N/R	NEGOTIATED R	RECOMMENDATION N/R	RECOMMENDATION R
10A	1040	PURCHASE PARTS	90	0		
10A	1040	PURCHASE PARTS	40	30		
10A	1040	PURCHASE PARTS	0	55		
		SUBTOTAL ACCT NO: 10A	130	85		
10C	1040	TOOLING MATERIAL	10522	0		
10C	1040	TOOLING MATERIAL	497	0		
		SUBTOTAL ACCT NO: 10C	11019	0		
20A	1060	SHIPPING	15	0		
		SUBTOTAL ACCT NO: 20A	15	0		
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
40D	1050	QUALITY CONTROL/INSPECTION	0	3		
		SUBTOTAL ACCT NO: 40D	12	3		
		TOTAL HOURS	262	168		
		TOTAL DOLLARS	11169	85		

Figure 7

Cost Proposal Evaluation Format - Negotiated

DATE:06/30/86
PAGE: 1

TEST
COST PROPOSAL EVALUATION FORMAT

LOT NO: 1
WBS NO: 01.01
NOMENCLATURE: BASE

ACCT	DEPT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDED N/R	RECOMMENDED R	NEGOTIATED N/R	NEGOTIATED R
10A	1040	PURCHASE PARTS	100	0	70	0	90	0
10A	1040	PURCHASE PARTS	70	0	40	30	40	30
10A	1040	PURCHASE PARTS	0	60	0	40	0	55
		SUBTOTAL ACCT NO: 10A	170	60	110	70	130	85
10C	1040	TOOLING MATERIAL	10522	0	10522	0	10522	0
10C	1040	TOOLING MATERIAL	497	0	450	0	497	0
		SUBTOTAL ACCT NO: 10C	11019	0	10972	0	627	0
20A	1060	SHIPPING	20	0	15	0	15	0
		SUBTOTAL ACCT NO: 20A	15	0	15	0	627	0
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
40D	1050	QUALITY CONTROL/INSPECTION	0	3	0	3	0	3
		SUBTOTAL ACCT NO: 40D	12	3	12	3	647	3
		TOTAL HOURS	285	163	252	168	262	168
		TOTAL DOLLARS	11214	60	11102	70	11169	85

Figure 8

Cost Proposal Evaluation Format - All Positions

the proposal onto the worksheets, these sheets can then be used to enter the evaluator's recommended position into the database.

Figure 6 is an example of the worksheet generated to display both the proposed and recommended positions for a given WBS number. Figure 7 then goes on to show the negotiated position with a corresponding set of blanks. The blanks can be filled in during the actual negotiation process to indicate any changes in the negotiation position as a result of the discussions taking place.

Figure 8 is a sample of the worksheet generated to display all three of the positions (proposed, recommended, and negotiated) on a single WBS number broken down by ACCT number and department. This provides the negotiator with a record of the changes made during the negotiation process.

Figures 9 through 16 show an alternative way of looking at the hours/dollars proposed, recommended and negotiated. In these figures, the hours/dollars are totaled by ACCT number either for an entire lot, or for a specified set of departments.

Figure 9 shows the lot summary of the proposed hours/dollars, with a corresponding blank position to allow the evaluators to make any notes or recommendations on the proposed position. Figure 10 is the same format as Figure 9, however multiple pages are generated for a single lot, with each page summarizing a specified department.

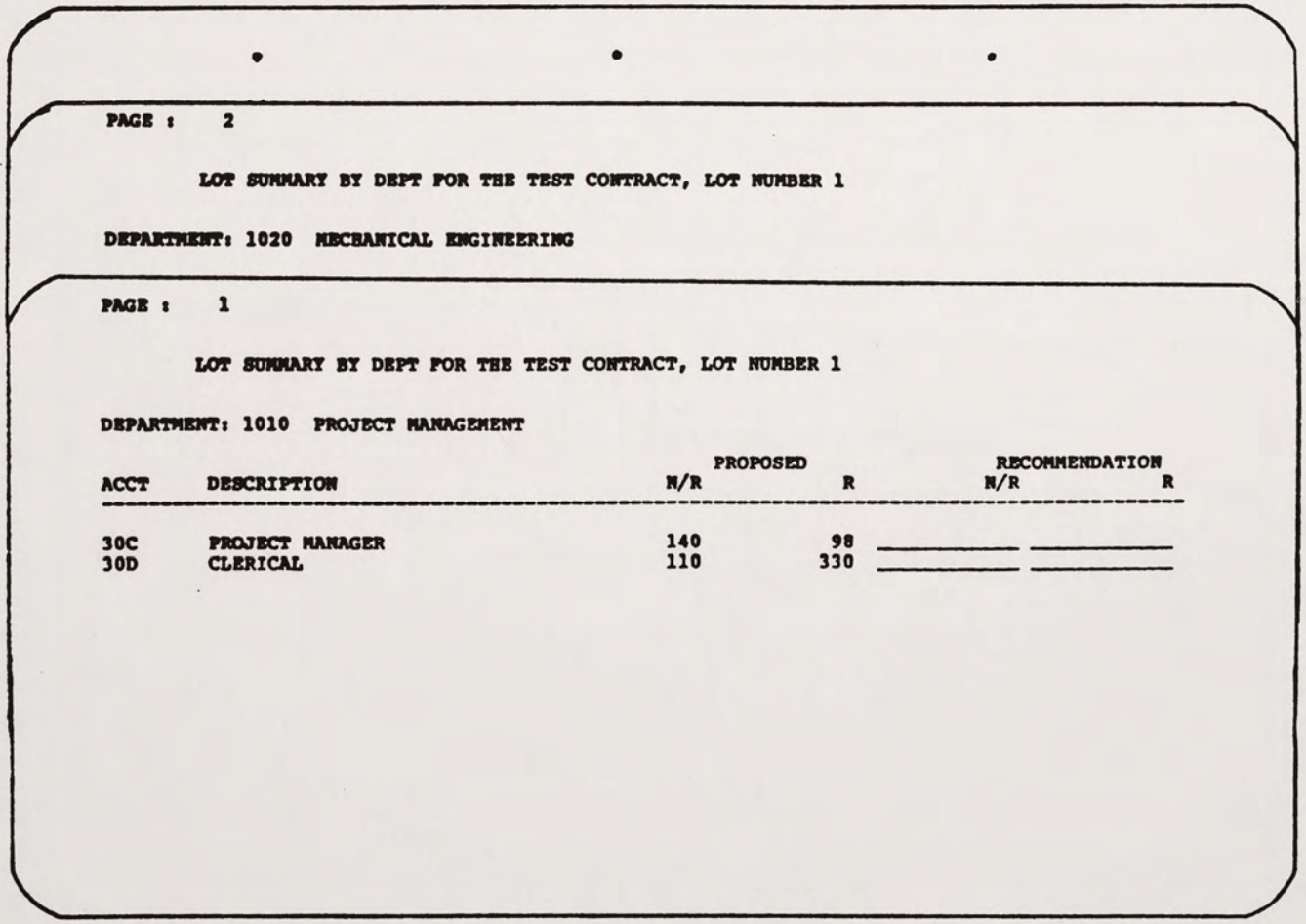
PAGE : 1

LOT SUMMARY FOR THE TEST CONTRACT, LOT NUMBER 1

ACCT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDATION N/R	RECOMMENDATION R
10A	PURCHASE PARTS	200	130		
10B	SUBCONTRACTS	35	175		
10C	TOOLING MATERIAL	11159	0		
20A	SHIPPING	67	24		
20B	INSURANCE	5	17		
30A	MECHANICAL DESIGN	120	0		
30B	DESIGN & DRAFTING	90	9		
30C	PROJECT MANAGER	140	98		
30D	CLERICAL	110	330		
30E	PRODUCT ASSURANCE	25	28		
40A	FABRICATION	50	21		
40B	SUBASSEMBLY	15	13		
40C	FINAL ASSEMBLY	40	13		
40D	QUALITY CONTROL/INSPECTION	45	10		
40E	PACKING	30	15		

Figure 9

Lot Summary - Proposed



PAGE : 2

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1020 MECHANICAL ENGINEERING

PAGE : 1

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1010 PROJECT MANAGEMENT

ACCT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDATION N/R	RECOMMENDATION R
30C	PROJECT MANAGER	140	98		
30D	CLERICAL	110	330		

Figure 10

Lot Summary by Department - Proposed

PAGE : 1

LOT SUMMARY FOR THE TEST CONTRACT, LOT NUMBER 1

ACCT	DESCRIPTION	PROPOSED		RECOMMENDED		DIFFERENCE	
		N/R	R	N/R	R	N/R	R
10A	PURCHASE PARTS	200	130	140	128	60	2
10B	SUBCONTRACTS	35	175	40	165	-5	10
10C	TOOLING MATERIAL	11159	0	11102	0	57	0
20A	SHIPPING	67	24	57	21	10	3
20B	INSURANCE	5	17	5	10	0	7
30A	MECHANICAL DESIGN	120	0	110	0	10	0
30B	DESIGN & DRAFTING	90	9	85	8	5	1
30C	PROJECT MANAGER	140	98	115	96	25	2
30D	CLERICAL	110	330	88	250	22	80
30E	PRODUCT ASSURANCE	25	28	25	23	0	5
40A	FABRICATION	50	21	45	18	5	3
40B	SUBASSEMBLY	15	13	12	12	3	1
40C	FINAL ASSEMBLY	40	13	35	18	5	-5
40D	QUALITY CONTROL/INSPECTION	45	10	31	10	14	0
40E	PACKING	30	15	25	10	5	5

Figure 11

Lot Summary - Proposed, Recommended and Difference

PAGE : 2

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1020 MECHANICAL ENGINEERING

PAGE : 1

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1010 PROJECT MANAGEMENT

ACCT	DESCRIPTION	PROPOSED		RECOMMENDED		DIFFERENCE	
		N/R	R	N/R	R	N/R	R
30C	PROJECT MANAGER	140	98	115	96	25	2
30D	CLERICAL	110	330	88	250	22	80

Figure 12

Lot Summary by Department - Proposed, Recommended and Difference

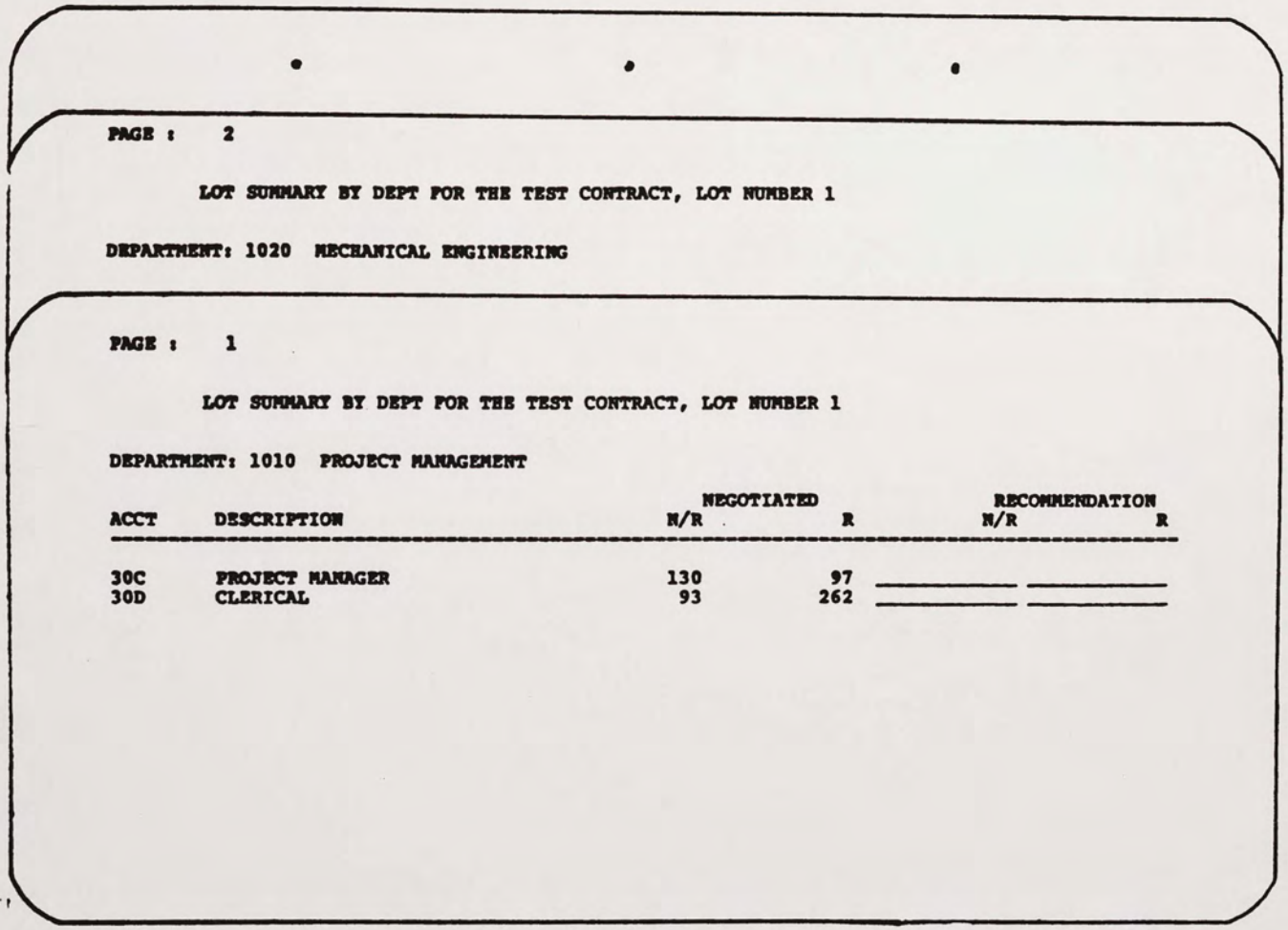
PAGE : 1

LOT SUMMARY FOR THE TEST CONTRACT, LOT NUMBER 1

ACCT	DESCRIPTION	NEGOTIATED N/R	NEGOTIATED R	RECOMMENDATION N/R	RECOMMENDATION R
10A	PURCHASE PARTS	160	143		
10B	SUBCONTRACTS	40	167		
10C	TOOLING MATERIAL	11154	0		
20A	SHIPPING	62	22		
20B	INSURANCE	5	10		
30A	MECHANICAL DESIGN	110	0		
30B	DESIGN & DRAFTING	85	9		
30C	PROJECT MANAGER	130	97		
30D	CLERICAL	93	262		
30E	PRODUCT ASSURANCE	25	31		
40A	FABRICATION	45	19		
40B	SUBASSEMBLY	14	13		
40C	FINAL ASSEMBLY	35	18		
40D	QUALITY CONTROL/INSPECTION	37	10		
40E	PACKING	25	15		

Figure 13

Lot Summary - Negotiated



PAGE : 2

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1020 MECHANICAL ENGINEERING

PAGE : 1

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1010 PROJECT MANAGEMENT

ACCT	DESCRIPTION	NEGOTIATED N/R	NEGOTIATED R	RECOMMENDATION N/R	RECOMMENDATION R
30C	PROJECT MANAGER	130	97		
30D	CLERICAL	93	262		

Figure 14

Lot Summary by Department - Negotiated

PAGE : 1

LOT SUMMARY FOR THE TEST CONTRACT, LOT NUMBER 1

ACCT	DESCRIPTION	PROPOSED		RECOMMENDED		NEGOTIATED	
		N/R	R	N/R	R	N/R	R
10A	PURCHASE PARTS	200	130	140	128	160	143
10B	SUBCONTRACTS	35	175	40	165	40	167
10C	TOOLING MATERIAL	11159	0	11102	0	11154	0
20A	SHIPPING	67	24	57	21	62	22
20B	INSURANCE	5	17	5	10	5	10
30A	MECHANICAL DESIGN	120	0	110	0	110	0
30B	DESIGN & DRAFTING	90	9	85	8	85	9
30C	PROJECT MANAGER	140	98	115	96	130	97
30D	CLERICAL	110	330	88	250	93	262
30E	PRODUCT ASSURANCE	25	28	25	23	25	31
40A	FABRICATION	50	21	45	18	45	19
40B	SUBASSEMBLY	15	13	12	12	14	13
40C	FINAL ASSEMBLY	40	13	35	18	35	18
40D	QUALITY CONTROL/INSPECTION	45	10	31	10	37	10
40E	PACKING	30	15	25	10	25	15

Figure 15

Lot Summary - All Positions

PAGE : 2

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1020 MECHANICAL ENGINEERING

PAGE : 1

LOT SUMMARY BY DEPT FOR THE TEST CONTRACT, LOT NUMBER 1

DEPARTMENT: 1010 PROJECT MANAGEMENT

ACCT	DESCRIPTION	PROPOSED N/R	PROPOSED R	RECOMMENDED N/R	RECOMMENDED R	NEGOTIATED N/R	NEGOTIATED R
30C	PROJECT MANAGER	140	98	115	96	130	97
30D	CLERICAL	110	330	88	250	93	262

Figure 16

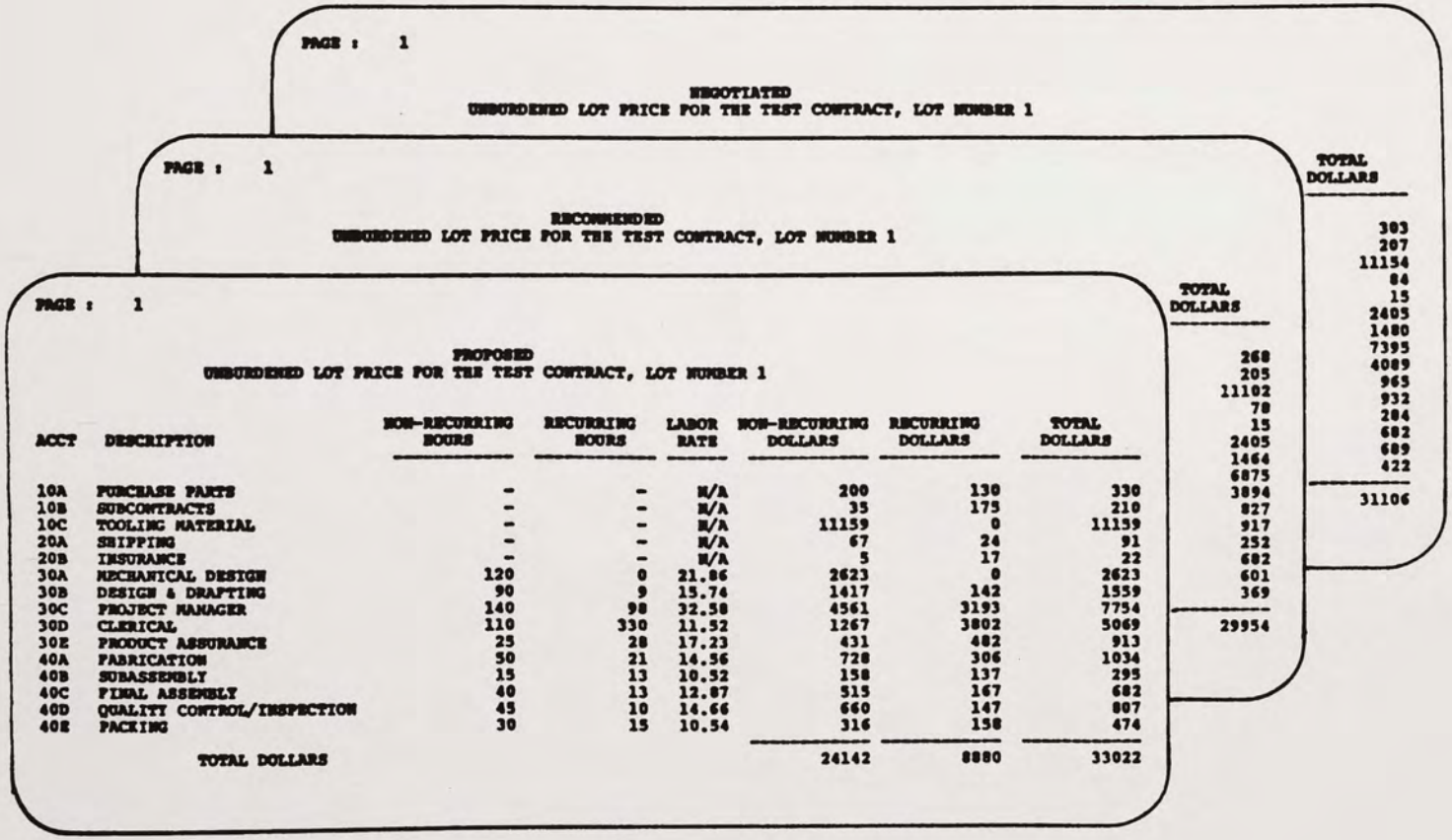
Lot Summary by Department - All Positions

Figure 11 shows the lot summary of the proposed and recommended hours/dollars, with the calculated difference between the two positions. This will allow the negotiator to note where the large discrepancies are between the two positions, and thus concentrate on those areas with the greatest disparities. Figure 12 is the same format as Figure 11, however multiple pages are generated for a single lot, with each page summarizing a specified department.

Figure 13 shows the lot summary of the negotiated hours/dollars, with a corresponding blank position to allow the negotiator to make any notes or changes to the negotiated position. Figure 14 is the same format as Figure 13, however multiple pages are generated for a single lot, with each page summarizing a specified department.

Figure 15 is the lot summary generated to display all three of the positions (proposed, recommended, and negotiated) as summarized by ACCT number. This provides the negotiator with a summary of the changes made during the negotiation process. Figure 16 is the same format as Figure 15, however multiple pages are generated for a single lot, with each page summarizing a specified department.

Figures 17 through 20 are examples of the unburdened pricing capabilites of the SNAP system. Figure 17 shows



PAGE : 1

NEGOTIATED
UNBURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

PAGE : 1

RECOMMENDED
UNBURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

TOTAL DOLLARS
303
207
11154
84
15
2405
1480
7395
4089
965
932
284
682
689
422
31106

PAGE : 1

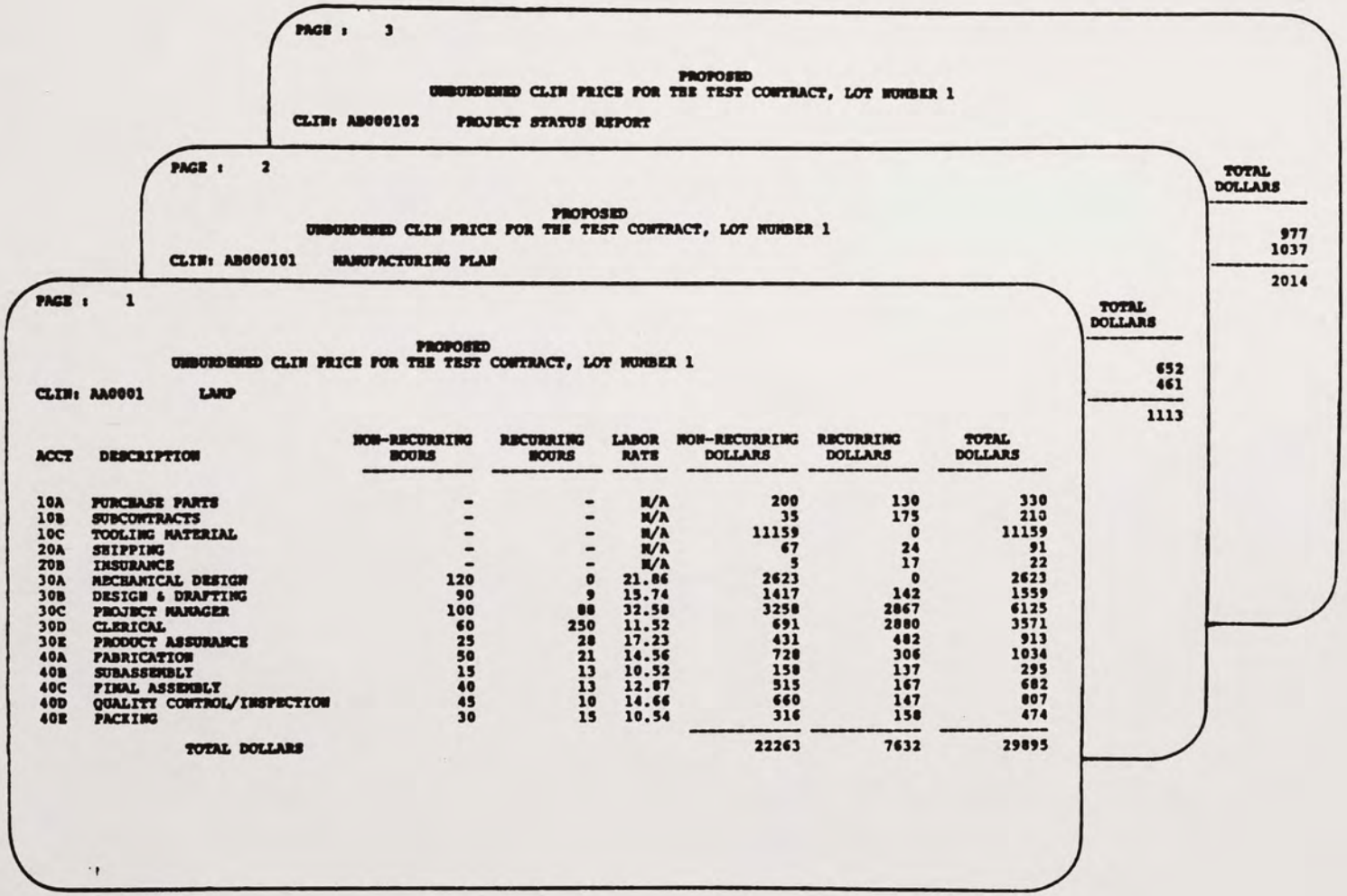
PROPOSED
UNBURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	200	130	330
10B	SUBCONTRACTS	-	-	N/A	35	175	210
10C	TOOLING MATERIAL	-	-	N/A	11159	0	11159
20A	SHIPPING	-	-	N/A	67	24	91
20B	INSURANCE	-	-	N/A	5	17	22
30A	MECHANICAL DESIGN	120	0	21.86	2623	0	2623
30B	DESIGN & DRAFTING	90	9	15.74	1417	142	1559
30C	PROJECT MANAGER	140	98	32.58	4561	3193	7754
30D	CLERICAL	110	330	11.52	1267	3802	5069
30E	PRODUCT ASSURANCE	25	28	17.23	431	482	913
40A	FABRICATION	50	21	14.56	728	306	1034
40B	SUBASSEMBLY	15	13	10.52	158	137	295
40C	FINAL ASSEMBLY	40	13	12.87	515	167	682
40D	QUALITY CONTROL/INSPECTION	45	10	14.66	660	147	807
40E	PACKING	30	15	10.54	316	158	474
	TOTAL DOLLARS				24142	8880	33022

TOTAL DOLLARS
268
205
11102
78
15
2405
1464
6875
3894
827
917
252
682
601
369
29954

Figure 17

Unburdened Lot Price



PAGE : 3

PROPOSED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000102 PROJECT STATUS REPORT

PAGE : 2

PROPOSED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

TOTAL DOLLARS
977
1037
2014

PAGE : 1

PROPOSED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

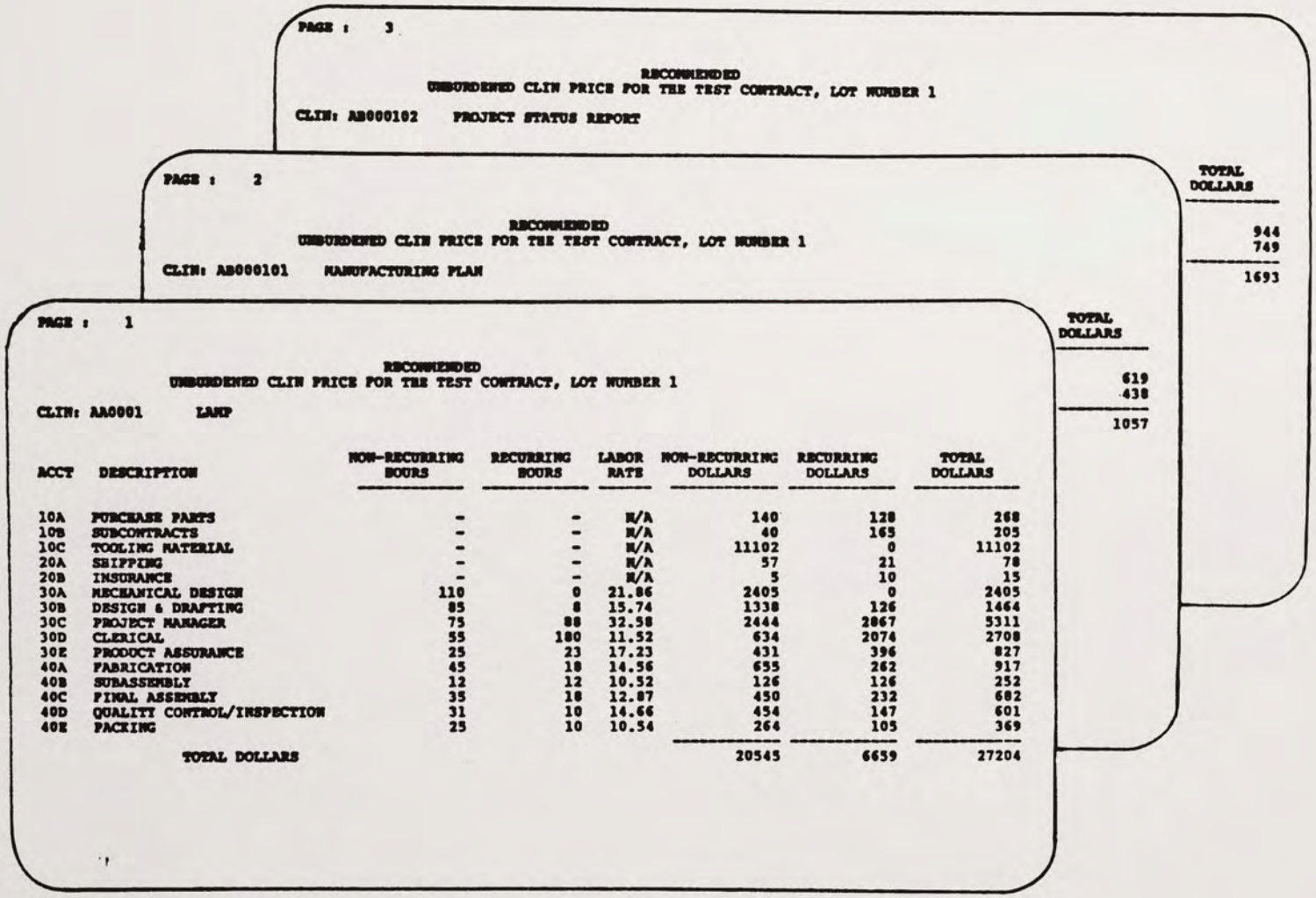
CLIN: AA0001 LAMP

TOTAL DOLLARS
652
461
1113

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	200	130	330
10B	SUBCONTRACTS	-	-	N/A	35	175	210
10C	TOOLING MATERIAL	-	-	N/A	11159	0	11159
20A	SHIPPING	-	-	N/A	67	24	91
20B	INSURANCE	-	-	N/A	5	17	22
30A	MECHANICAL DESIGN	120	0	21.86	2623	0	2623
30B	DESIGN & DRAFTING	90	9	15.74	1417	142	1559
30C	PROJECT MANAGER	100	88	32.58	3258	2867	6125
30D	CLERICAL	60	250	11.52	691	2880	3571
30E	PRODUCT ASSURANCE	25	28	17.23	431	482	913
40A	FABRICATION	50	21	14.56	728	306	1034
40B	SUBASSEMBLY	15	13	10.52	158	137	295
40C	FINAL ASSEMBLY	40	13	12.87	515	167	682
40D	QUALITY CONTROL/INSPECTION	45	10	14.66	660	147	807
40E	PACKING	30	15	10.54	316	158	474
	TOTAL DOLLARS				22263	7632	29895

Figure 18

Unburdened CLIN Price - Proposed



PAGE : 3

RECOMMENDED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000102 PROJECT STATUS REPORT

PAGE : 2

RECOMMENDED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

TOTAL DOLLARS
944
749
1693

PAGE : 1

RECOMMENDED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

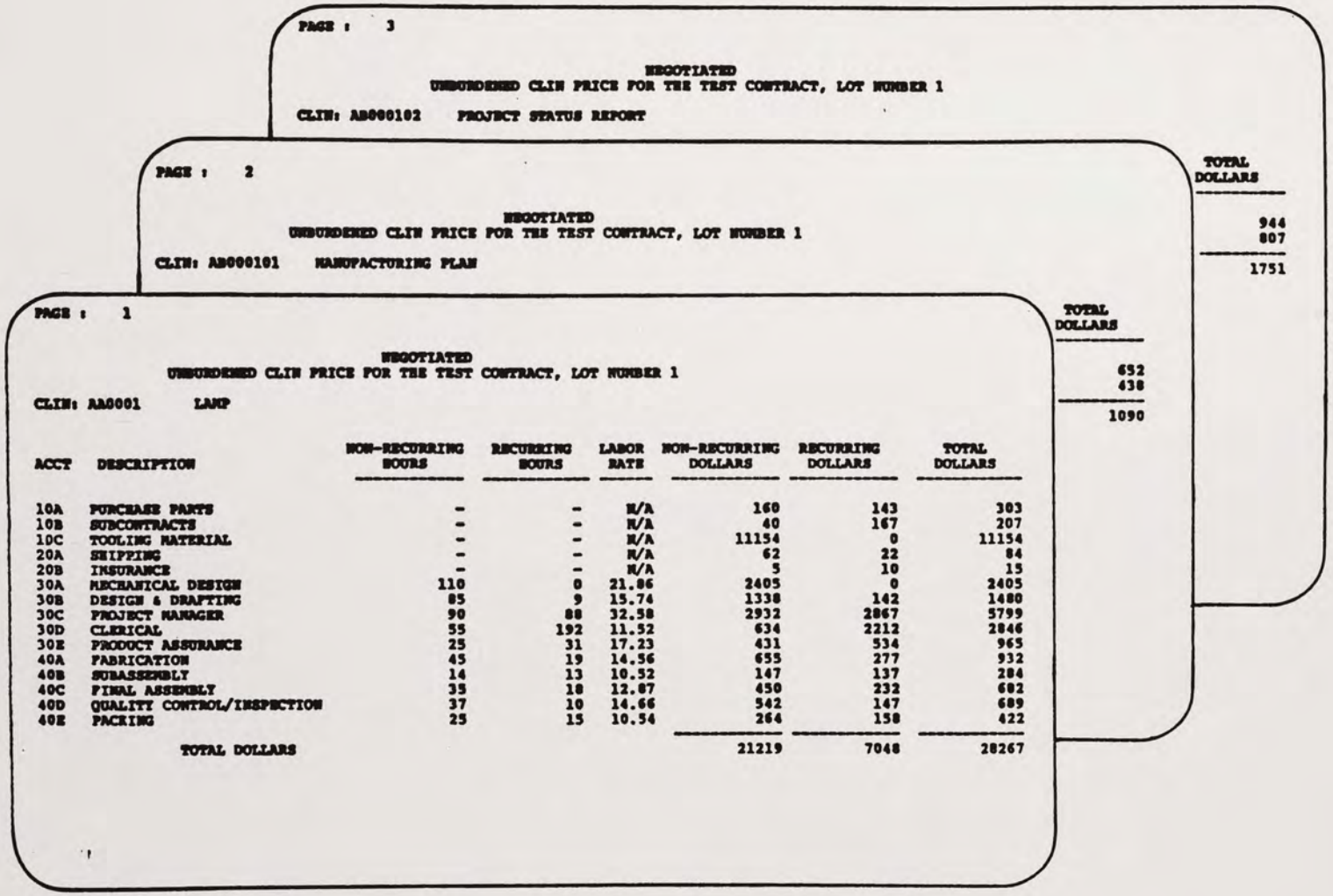
CLIN: AA0001 LAMP

TOTAL DOLLARS
619
438
1057

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	140	128	268
10B	SUBCONTRACTS	-	-	N/A	40	165	205
10C	TOOLING MATERIAL	-	-	N/A	11102	0	11102
20A	SHIPPING	-	-	N/A	57	21	78
20B	INSURANCE	-	-	N/A	5	10	15
30A	MECHANICAL DESIGN	110	0	21.86	2405	0	2405
30B	DESIGN & DRAFTING	85	8	15.74	1338	126	1464
30C	PROJECT MANAGER	75	88	32.58	2444	2867	5311
30D	CLERICAL	55	180	11.52	634	2074	2708
30E	PRODUCT ASSURANCE	25	23	17.23	431	396	827
40A	FABRICATION	45	18	14.56	655	262	917
40B	SUBASSEMBLY	12	12	10.52	126	126	252
40C	FINAL ASSEMBLY	35	18	12.87	450	232	682
40D	QUALITY CONTROL/INSPECTION	31	10	14.66	454	147	601
40E	PACKING	25	10	10.54	264	105	369
	TOTAL DOLLARS				20545	6659	27204

Figure 19

Unburdened CLIN Price - Recommended



PAGE : 3

NEGOTIATED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000102 PROJECT STATUS REPORT

PAGE : 2

NEGOTIATED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

PAGE : 1

NEGOTIATED
UNBURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AA0001 LAMP

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	160	143	303
10B	SUBCONTRACTS	-	-	N/A	40	167	207
10C	TOOLING MATERIAL	-	-	N/A	11154	0	11154
20A	SHIPPING	-	-	N/A	62	22	84
20B	INSURANCE	-	-	N/A	5	10	15
30A	MECHANICAL DESIGN	110	0	21.86	2405	0	2405
30B	DESIGN & DRAFTING	85	9	15.74	1338	142	1480
30C	PROJECT MANAGER	90	88	32.58	2932	2867	5799
30D	CLERICAL	55	192	11.52	634	2212	2846
30E	PRODUCT ASSURANCE	25	31	17.23	431	534	965
40A	FABRICATION	45	19	14.56	655	277	932
40B	SUBASSEMBLY	14	13	10.52	147	137	284
40C	FINAL ASSEMBLY	35	18	12.87	450	232	682
40D	QUALITY CONTROL/INSPECTION	37	10	14.66	542	147	689
40E	PACKING	25	15	10.54	264	158	422
	TOTAL DOLLARS				21219	7048	28267

TOTAL DOLLARS

652
438

1090

TOTAL DOLLARS

944
807

1751

Figure 20

Unburdened CLIN Price - Negotiated

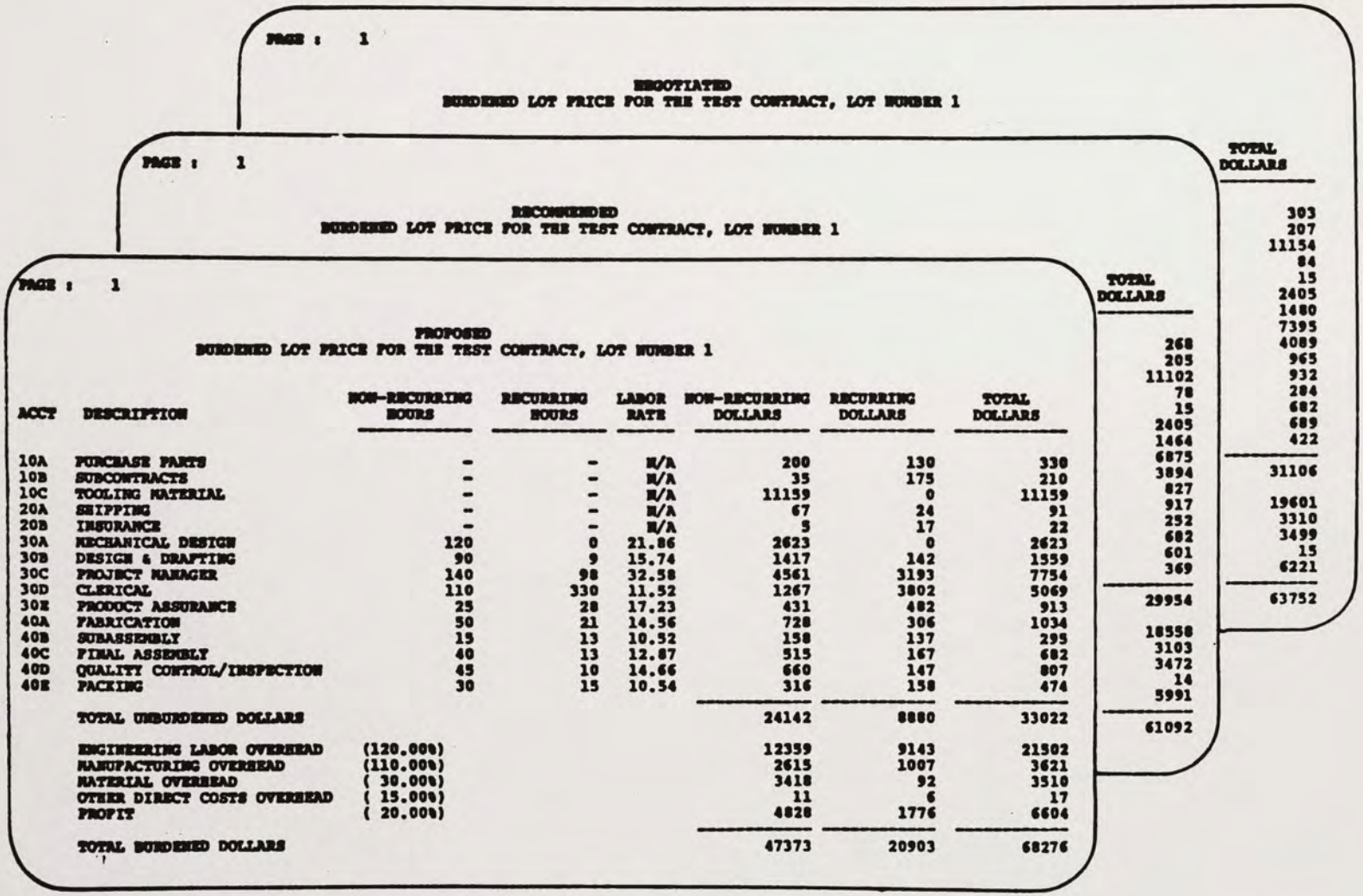
the unburdened pricing report for the entire lot, with separate reports generated for each of the three positions (proposed, recommended, and negotiated). The actual hours and dollars associated with each of the ACCT numbers is readily visible on each of these reports.

Figure 18 shows the same unburdened pricing report as Figure 17 for the proposed hours/dollars, however in Figure 18, the price is calculated for each of the Contract Line Item Numbers (CLIN). Note that the sum of the CLIN prices equates to the total lot price.

Figures 19 and 20 are exactly the same as Figure 18, however the positions priced in these figures are the recommended and negotiated hours/dollars, respectively.

The last set of figures, Figures 21 through 24, are probably the most useful pricing reports generated from the SNAP system during contract negotiations. These figures contain samples of the total (burdened) pricing reports for each of the three positions (proposed, recommended, and negotiated).

Figure 21 shows the reports generated to price the entire lot for each of the positions. The actual hours and dollars associated with each of the ACCT numbers is readily visible on each of these reports, as well as the actual dollars associated with each of the burdens applied to the specifed lot and contract. These reports can be used by the negotiator to determine the total price of their



PAGE : 1

NEGOTIATED
BURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

PAGE : 1

RECOMMENDED
BURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

PAGE : 1

PROPOSED
BURDENED LOT PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

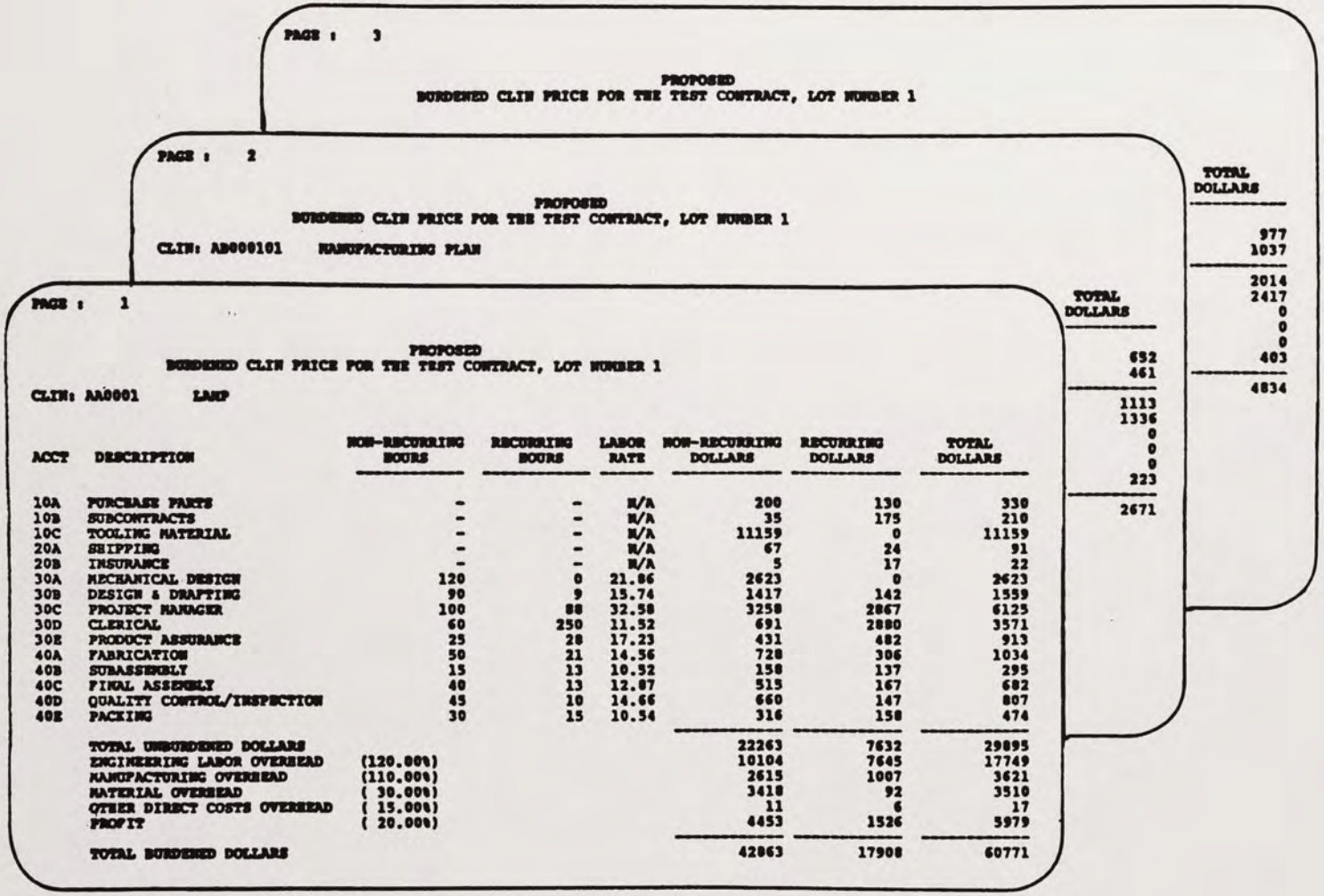
ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	200	130	330
10B	SUBCONTRACTS	-	-	N/A	35	175	210
10C	TOOLING MATERIAL	-	-	N/A	11159	0	11159
20A	SHIPPING	-	-	N/A	67	24	91
20B	INSURANCE	-	-	N/A	5	17	22
30A	MECHANICAL DESIGN	120	0	21.86	2623	0	2623
30B	DESIGN & DRAFTING	90	9	15.74	1417	142	1559
30C	PROJECT MANAGER	140	98	32.58	4561	3193	7754
30D	CLERICAL	110	330	11.52	1267	3802	5069
30E	PRODUCT ASSURANCE	25	28	17.23	431	482	913
40A	FABRICATION	50	21	14.56	728	306	1034
40B	SUBASSEMBLY	15	13	10.52	158	137	295
40C	FINAL ASSEMBLY	40	13	12.87	515	167	682
40D	QUALITY CONTROL/INSPECTION	45	10	14.66	660	147	807
40E	PACKING	30	15	10.54	316	158	474
	TOTAL UNBURDENED DOLLARS				24142	8880	33022
	ENGINEERING LABOR OVERHEAD	(120.00%)			12359	9143	21502
	MANUFACTURING OVERHEAD	(110.00%)			2615	1007	3621
	MATERIAL OVERHEAD	(30.00%)			3418	92	3510
	OTHER DIRECT COSTS OVERHEAD	(15.00%)			11	6	17
	PROFIT	(20.00%)			4828	1776	6604
	TOTAL BURDENED DOLLARS				47373	20903	68276

TOTAL DOLLARS
268
205
11102
78
15
2405
1464
6875
3894
827
917
252
682
601
369
29954
18558
3103
3472
14
5991
61092

TOTAL DOLLARS
303
207
11154
84
15
2405
1480
7395
4089
965
932
284
682
689
422
31106
19601
3310
3499
15
6221
63752

Figure 21

Burdened Lot Price



PAGE : 3

PROPOSED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

PAGE : 2

PROPOSED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

PAGE : 1

PROPOSED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AA0001 LAMP

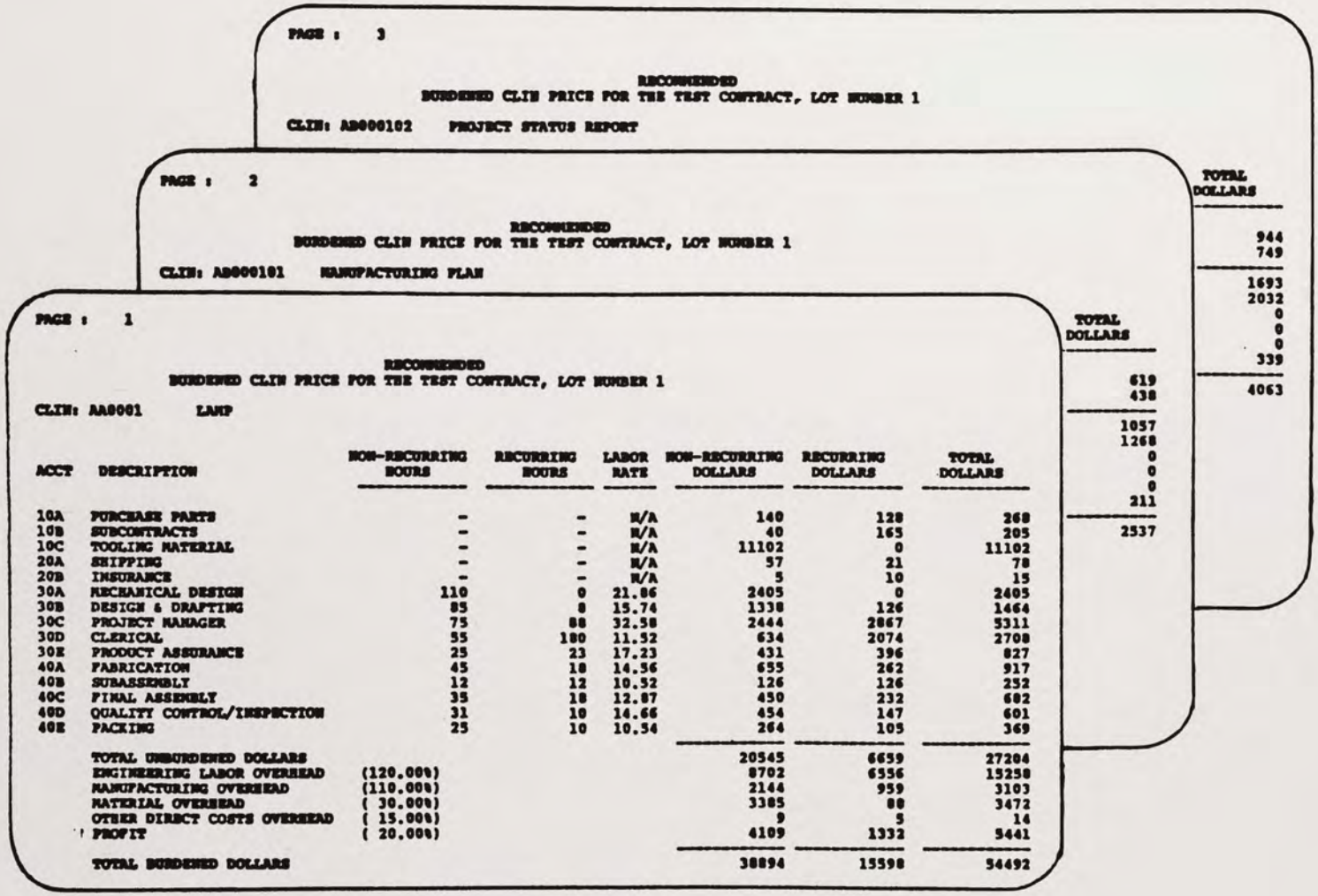
ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	200	130	330
10B	SUBCONTRACTS	-	-	N/A	35	175	210
10C	TOOLING MATERIAL	-	-	N/A	11159	0	11159
20A	SHIPPING	-	-	N/A	67	24	91
20B	INSURANCE	-	-	N/A	5	17	22
30A	MECHANICAL DESIGN	120	0	21.86	2623	0	2623
30B	DESIGN & DRAFTING	90	9	15.74	1417	142	1559
30C	PROJECT MANAGER	100	88	32.58	3258	2867	6125
30D	CLERICAL	60	250	11.52	691	2880	3571
30E	PRODUCT ASSURANCE	25	28	17.23	431	482	913
40A	FABRICATION	50	21	14.56	728	306	1034
40B	SUBASSEMBLY	15	13	10.52	158	137	295
40C	FINAL ASSEMBLY	40	13	12.87	515	167	682
40D	QUALITY CONTROL/INSPECTION	45	10	14.66	660	147	807
40E	PACKING	30	15	10.54	316	158	474
	TOTAL UNBURDENED DOLLARS				22263	7632	29895
	ENGINEERING LABOR OVERHEAD	(120.00%)			10104	7645	17749
	MANUFACTURING OVERHEAD	(110.00%)			2615	1007	3621
	MATERIAL OVERHEAD	(30.00%)			3418	92	3510
	OTHER DIRECT COSTS OVERHEAD	(15.00%)			11	6	17
	PROFIT	(20.00%)			4453	1526	5979
	TOTAL BURDENED DOLLARS				42863	17908	60771

TOTAL DOLLARS
652
461
1113
1336
0
0
0
223
2671

TOTAL DOLLARS
977
1037
2014
2417
0
0
0
403
4834

Figure 22

Burdened CLIN Price - Proposed



PAGE : 3

RECOMMENDED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000102 PROJECT STATUS REPORT

PAGE : 2

RECOMMENDED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

PAGE : 1

RECOMMENDED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AA0001 LAMP

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	140	128	268
10B	SUBCONTRACTS	-	-	N/A	40	165	205
10C	TOOLING MATERIAL	-	-	N/A	11102	0	11102
20A	SHIPPING	-	-	N/A	57	21	78
20B	INSURANCE	-	-	N/A	5	10	15
30A	MECHANICAL DESIGN	110	0	21.86	2405	0	2405
30B	DESIGN & DRAFTING	85	8	15.74	1338	126	1464
30C	PROJECT MANAGER	75	88	32.58	2444	2867	5311
30D	CLERICAL	55	180	11.52	634	2074	2708
30E	PRODUCT ASSURANCE	25	23	17.23	431	396	827
40A	FABRICATION	45	18	14.56	655	262	917
40B	SUBASSEMBLY	12	12	10.52	126	126	252
40C	FINAL ASSEMBLY	35	18	12.87	450	232	682
40D	QUALITY CONTROL/INSPECTION	31	10	14.66	454	147	601
40E	PACKING	25	10	10.54	264	105	369
	TOTAL UNBURDENED DOLLARS				20545	6659	27204
	ENGINEERING LABOR OVERHEAD	(120.00%)			8702	6556	15258
	MANUFACTURING OVERHEAD	(110.00%)			2144	959	3103
	MATERIAL OVERHEAD	(30.00%)			3385	88	3472
	OTHER DIRECT COSTS OVERHEAD	(15.00%)			9	5	14
	PROFIT	(20.00%)			4109	1332	5441
	TOTAL BURDENED DOLLARS				38894	15598	54492

TOTAL DOLLARS

619
438
1057
1268
0
0
0
211
2537

TOTAL DOLLARS

944
749
1693
2032
0
0
0
339
4063

Figure 23

Burdened CLIN Price - Recommended

PAGE : 3

NEGOTIATED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000102 PROJECT STATUS REPORT

PAGE : 2

NEGOTIATED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AB000101 MANUFACTURING PLAN

PAGE : 1

NEGOTIATED
BURDENED CLIN PRICE FOR THE TEST CONTRACT, LOT NUMBER 1

CLIN: AA0001 LAMP

ACCT	DESCRIPTION	NON-RECURRING HOURS	RECURRING HOURS	LABOR RATE	NON-RECURRING DOLLARS	RECURRING DOLLARS	TOTAL DOLLARS
10A	PURCHASE PARTS	-	-	N/A	160	143	303
10B	SUBCONTRACTS	-	-	N/A	40	167	207
10C	TOOLING MATERIAL	-	-	N/A	11154	0	11154
20A	SHIPPING	-	-	N/A	62	22	84
20B	INSURANCE	-	-	N/A	5	10	15
30A	MECHANICAL DESIGN	110	0	21.86	2405	0	2405
30B	DESIGN & DRAFTING	85	9	15.74	1338	142	1480
30C	PROJECT MANAGER	90	88	32.58	2932	2867	5799
30D	CLERICAL	55	192	11.52	634	2212	2846
30E	PRODUCT ASSURANCE	25	31	17.23	431	534	965
40A	FABRICATION	45	19	14.56	655	277	932
40B	SUBASSEMBLY	14	13	10.52	147	137	284
40C	FINAL ASSEMBLY	35	18	12.87	450	232	682
40D	QUALITY CONTROL/INSPECTION	37	10	14.66	542	147	689
40E	PACKING	25	15	10.54	264	158	422
	TOTAL UNBURDENED DOLLARS				21219	7048	28267
	ENGINEERING LABOR OVERHEAD	(120.00%)			9288	6906	16194
	MANUFACTURING OVERHEAD	(110.00%)			2264	1046	3310
	MATERIAL OVERHEAD	(30.00%)			3406	93	3499
	OTHER DIRECT COSTS OVERHEAD	(15.00%)			10	5	15
	PROFIT	(20.00%)			4244	1410	5653
	TOTAL BURDENED DOLLARS				40431	16508	56938

TOTAL DOLLARS
652
438
1090
1308
0
0
0
218
2616

TOTAL DOLLARS
944
807
1751
2101
0
0
0
350
4202

Figure 24

Burdened CLIN Price - Negotiated

present position and compare that to any budget limitations which may exist.

Figure 22 shows the same total (burdened) pricing report as Figure 21 for the proposed hours/dollars, however in Figure 22, the price is calculated for each of the Contract Line Item Numbers (CLIN). Note that the sum of the CLIN prices equates to the total lot price.

Figures 23 and 24 are exactly the same as Figure 22, however the positions priced in these figures are the recommended and negotiated hours/dollars, respectively.

CHAPTER VI

CONCLUSIONS AND POSSIBLE ENHANCEMENTS

Using SNAP during the proposal evaluation and negotiation process should shorten the amount of time required to evaluate the contractor's response, and complete the negotiation process, as well as provide the negotiator with additional information from which he can develop his negotiating strategy.

Use of the evaluator worksheets and department summaries by the evaluation team will provide a systematic approach to the evaluation process. With different evaluators using the same evaluation worksheets, communication within the evaluation team will be increased, resulting in the early identification of different interpretations of the proposal, and providing a more unified negotiation position. Use of the hour/dollar summaries in conjunction with the evaluation worksheets will provide the evaluator with different perspectives of the same work effort, and a more comprehensive evaluation can be completed.

The pricing reports generated by SNAP allow the negotiator to monitor the contract price throughout the negotiation process. Also, by changing the labor rates and/or burden rates, "what-if" drills can be completed by

rerunning the pricing reports. "What-if" drills can also be developed by changing any of the hour and/or dollar entries.

With the hour/dollar summaries as well as the pricing reports, the negotiator can monitor the proposed, recommended, and negotiated positions at all times during negotiations. Further, upon the completion of negotiations, the final reports can be used to justify the final contract price to top management.

With the additional information that SNAP makes available to the evaluators and the negotiators by displaying the same hours/dollars data in a variety of formats, a contractor and/or government agency using the SNAP system may achieve additional cost savings during the negotiations process, as well as decrease the actual amount of time required for negotiations.

Many enhancements could be made to the SNAP system, and some enhancements may be made to standardize it to a specific company/government agency that is using the system to include a standard set of cost accounts, departments, etc. However, some of the more generic enhancements that could be made to increase both the flexibility and versatility of the SNAP system are as follows:

Data entry of the proposed position could be done through the automated transfer of proposal data directly into the SNAP system. This could be done via a

communications line (e.g., a modem and phone line or a data network), floppy diskettes, or any number of other means of electronic data transfer.

The pricing reports (including any required formulas) could be written to a file which could be accessed by one or more of the commercially available spreadsheet software packages to allow the negotiator to obtain an even faster response to "what-if" drills.

The labor rates could be developed by a separate program module in which the labor rates would be computed from a base year (e.g., 1985) set of labor rates, a set of inflation indices, and an estimate of when the actual labor hours are to be expended on the contractual effort.

Several different sets of labor rates and burden rates could be maintained, and the user could be provided the option of selecting which set of labor and/or burden rates that they wish to use with the proposed, recommended, and/or negotiated hours/dollars to produce a single pricing report.

The material dollars could be entered in a base year dollar, and inflated within a program module to the specific time during the contractual effort that the material will actually be purchased.

The final negotiated pricing could be completed by month based on a manloading schedule to provide the

contractor with an estimate of when the contract dollars will actually be expended.

The networking capabilites of dBASE III PLUS could be enacted to allow multiple users to have access to the proposed, recommended, and negotiated data simultaneously through the SNAP system and to increase the speed of data entry/edit.

Finally, the databases developed and maintained throughout the use of the SNAP system during negotiations could later be used to track and update the actual costs of the contractual effort, to determine cost plus or incentive awards, as an historical cost database for completing cost estimates, or as an historical database to be used in evaluating future contract proposals.

These possible enhancements to the SNAP system would provide even more information to the evaluators and negotiators during negotiations, and could even further simplify negotiations with automated pricing.

APPENDIX

USER'S MANUAL

S N A P
A CONTRACT PRICING TOOL FOR THE MICROCOMPUTER

Version 1.0

Developed by:

Kris L. Hoffman

TABLE OF CONTENTS

SECTION I

GENERAL INSTRUCTIONS

In order to operate the Simplify Negotiations with Automated Pricing (SNAP) System, a knowledge of the operating system being used is assumed. To get started, you will need dBASE III PLUS[1] or a special version of dBASE III PLUS called dBRUN[2] which executes the encrytped version of dBASE III PLUS programs, as well as all of the program files required to support the proposal and negotiation pricing system. (These files are listed in Section III.) If any existing database files are to be used with the execution of this program, those files must conform to the database file structures and file naming conventions as described in Section II - Help, and must also be located within the same directory as dBASE III and/or dBRUN to be used with this program.

The following steps will assist you in utilizing the SNAP program (Note 1: <return> indicates to hit the carriage return or enter key), (Note 2: On each of the

---

[1] dBASE III PLUS is a database software package produced and copyrighted by Aston-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319, 1985.

[2] dBRUN is a software package which will run the encrypted version of a dBASE III PLUS program. It is also produced and copyrighted by Aston-Tate, 1985.

figures displayed, an underline indicates the location of the cursor, and the information displayed between a set of colons after a fieldname shows the actual contents of that field for the given record.):

STEP 1: Once all of the files are located in the appropriate directory on the disk, at the system prompt, if you are utilizing dBASE III PLUS, type:

DBASE SNAP <return>

or, if you are utilizing dBRUN, type:

DBRUN SNAP <return>

This initializes the program, and the screen will display the introduction screen shown in Figure 1. To continue, press <return> and proceed to Step 2. To return to the operating system, enter a 'Q'.

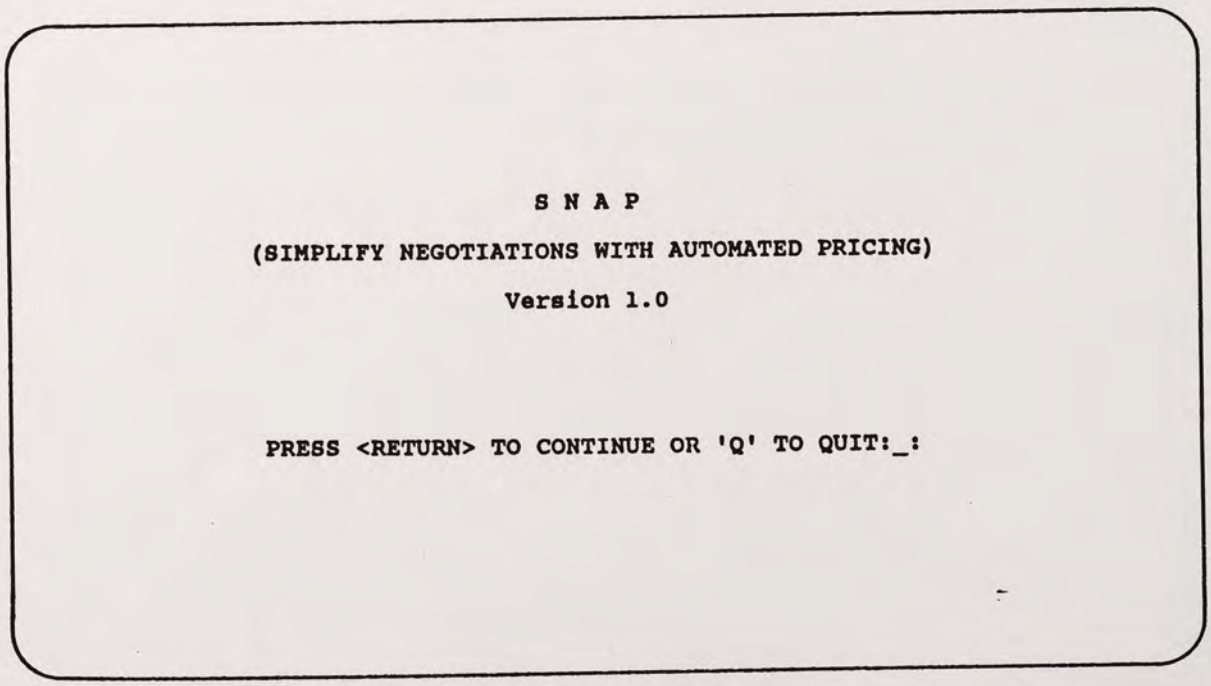


FIGURE 1

STEP 2: Figure 2 shows the next screen which will be displayed, allowing you to enter the four character contract identifier and one digit lot number which pertain to the specific contract and lot that you wish to enter/edit data in and/or generate report(s) from. A contract identifier must be specified, and the lot number must be between '0' and '9'. The contract identifier and lot number must be entered in order to comply with the naming convention as described in Section II - Help of this manual. Once these identifiers have been entered, proceed to Step 3 unless sent here from a step further into the program. If you returned to Step 2 to change the contract id and/or lot number from further into the program, return to the step which sent you to Step 2.

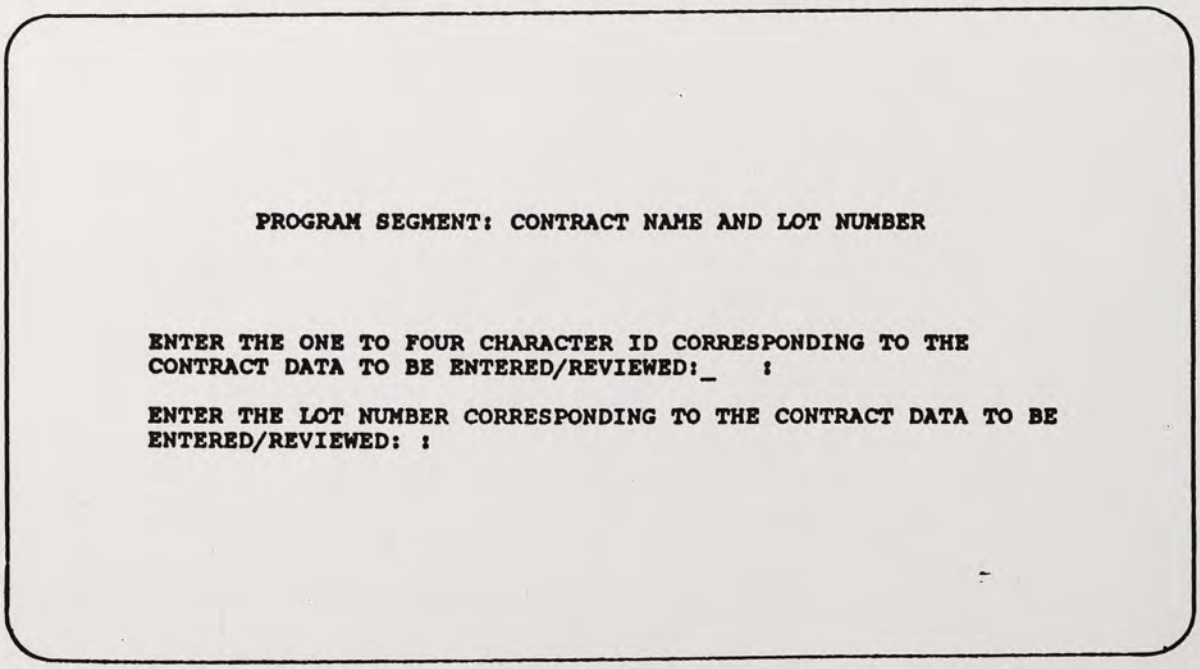


FIGURE 2

STEP 3: Figure 3 displays the program's main menu. There are certain sections of this screen which will remain standard throughout the use of this program. The top line of the screen will always display the program module that you are presently working in. (e.g., 'Program Segment: Pricing' is the general section of this program; 'Program Segment: Work Breakdown Structure' is the module used to add, edit, or delete any entries in the Work Breakdown Structure (WBS) file; 'Program Segment: Contract Line Item Number' is the section used to add, edit, or delete any entries in the Contract Line item Number (CLN) file; etc.) The second line of the screen will always display the contract identifier and contract lot number selected.

```
                          PROGRAM SEGMENT: PRICING
CONTRACT ID: LAMP                                  CONTRACT LOT: 1

W - ENTER/EDIT WBS (WORK BREAKDOWN STRUCTURE) & ASSOCIATED NOMENCLATURE
C - ENTER/EDIT CLIN (CONTRACT LINE ITEM NUMBER) & ASSOCIATED NOMENCLATURE
A - ENTER/EDIT ACCT (COST ACCOUNT) & ASSOCIATED NOMENCLATURE
D - ENTER/EDIT DEPT (DEPARTMENT) & ASSOCIATED NOMENCLATURE
L - ENTER/EDIT LABOR RATES WITH ASSOCIATED ACCOUNT NUMBERS
B - ENTER/EDIT BURDEN RATES WITH ASSOCIATED ACCOUNT NUMBERS
H - ENTER/EDIT HOURS/DOLLARS BY WBS, ACCT, AND DEPT

G - GO TO THE REPORT MENU

F - CHANGE THE ACTIVE FILE (CONTRACT ID AND/OR LOT NUMBER)

R - RETURN TO OPERATING SYSTEM

                ENTER THE LETTER OF YOUR SELECTION:_:
```

FIGURE 3

At this point you may select from the menu which function you wish to perform utilizing the specified contract and lot. If you select 'W' to enter/edit WBS (Work Breakdown Structure) numbers and associated nomenclature data, you should proceed to Step 4. If you select 'C' to enter/edit CLIN (Contract Line Item Number) and associated nomenclature data, you should proceed to Step 12. If you select 'A' to enter/edit ACCT (cost account) numbers and associated nomenclature data, you should proceed to Step 20. If you select 'D' to enter/edit DEPT (department) and associated nomenclature data, you should proceed to Step 28. If you select 'L' to enter/edit labor rates with the associated account numbers, you should proceed to Step 36. If you select 'B' to enter/edit burden rates and associated accounts numbers, you should proceed to Step 40. If you select 'H' to enter/edit hours/dollars by WBS, ACCT, and DEPT, proceed to Step 55. If you select 'G' to go to the report menu, proceed to Step 65. If you select 'F' to change the contract id and/or lot number, return to Step 2. If you select 'R', you will terminate the program and return to the operating system. If any character other than 'W', 'C', 'A', 'D', 'L', 'B', 'H', 'G', 'F', or 'R' is entered, an error message will be displayed, and a correction will be requested.

STEP 4: Figure 4 shows the screen which will be displayed when the user has selected to enter/edit the WBS

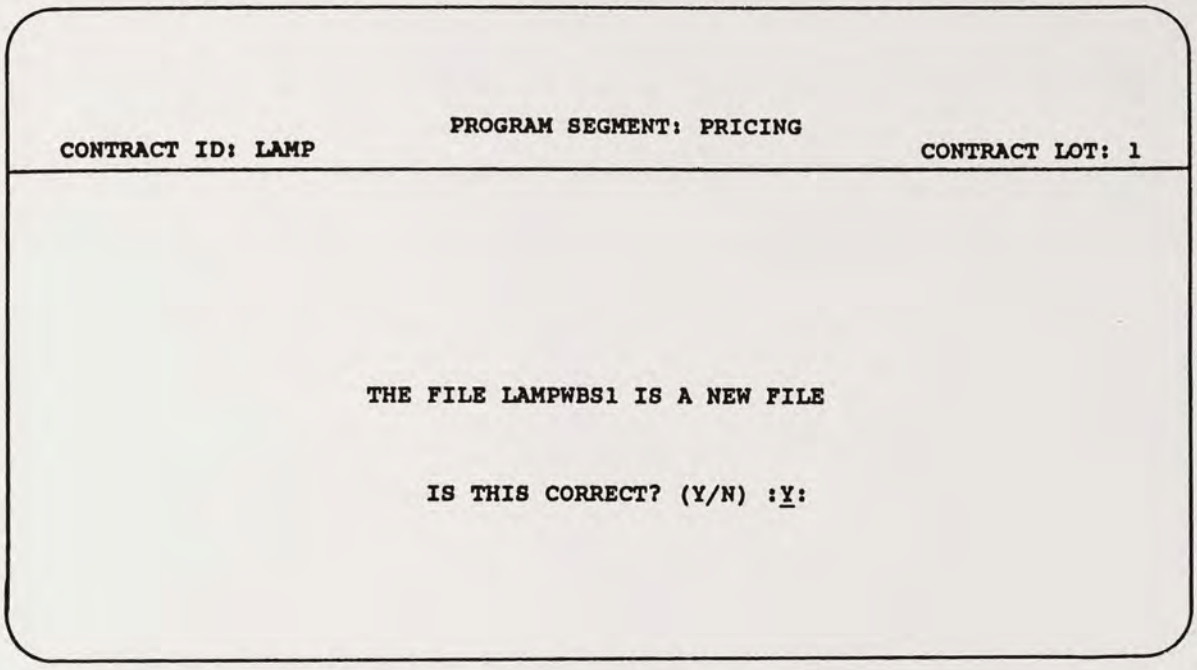


FIGURE 4

numbers and associated nomenclature for the first time for a given contract and lot. If the user has selected this option on a file already existing on the disk, the screen shown in Figure 4 will not be displayed, and the user may advance directly to Step 6.

When the user has selected a given contract and lot, this specifies the data file to be edited, and this program is set up to check for the existence of the selected data file within the active directory. If the file is not found, Figure 4 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' to allow the program to create the new file, and proceed to Step 6. If the file

should already exist within the active directory but was not found, enter an 'N' and proceed to Step 5. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and the user will be asked to enter his/her choice again.

STEP 5: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract identifier or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

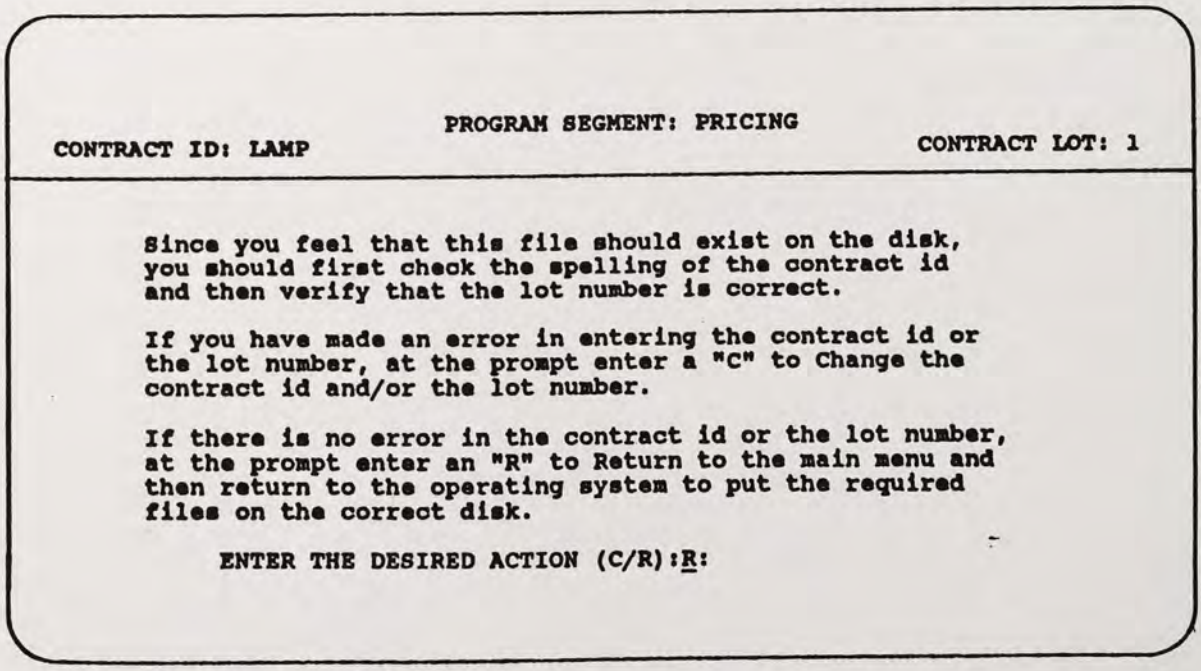


FIGURE 5

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 2, Figure 2), and then another 'R' to return to the operating system and check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 6: Figure 6 shows the screen displayed when the WBS file has been correctly found and/or created. Note that the center of the second line on the screen displays the name of the data file which will be used in all subsequent WBS transactions. If the file name displayed is not the data file you wish to be presently working with, select an 'R' from the menu to return to the main menu (Step 2, Figure 2), and then select an 'F' to change the active file.

This screen, Figure 6, as well as all of the enter/

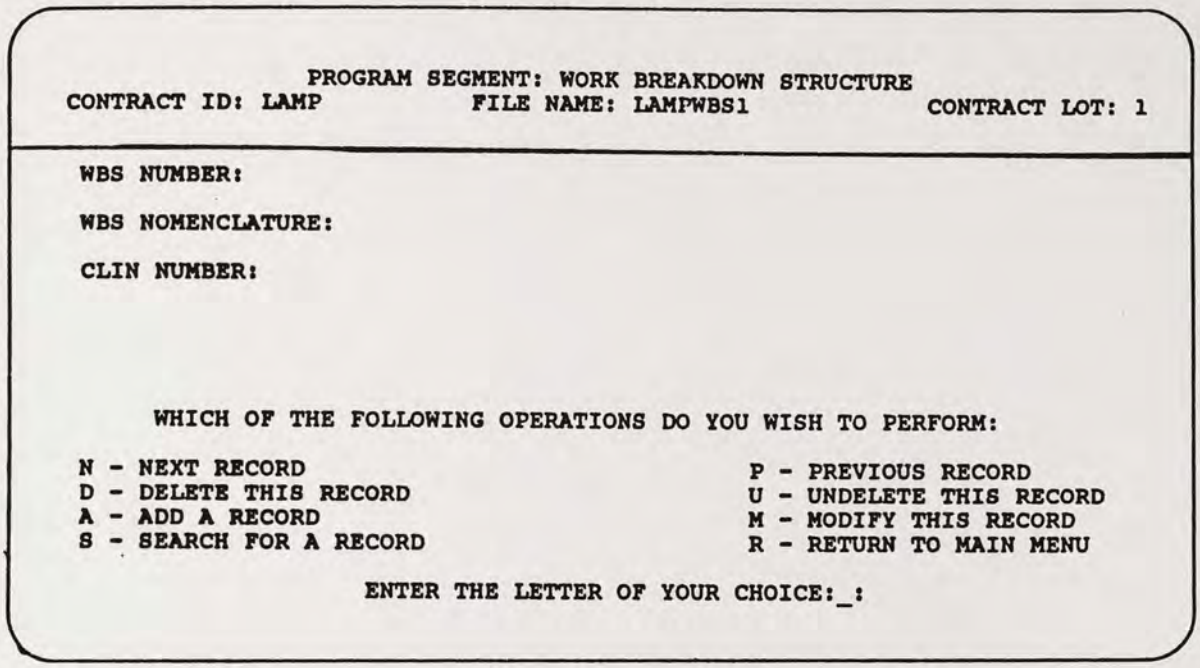


FIGURE 6

edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of possible actions to take on the active data file. Within the WBS data file selected, the first record displayed is the lowest WBS number in the file. All records in the file are sorted in ascending order by WBS number for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: WBS NUMBER - the

alphanumeric sequence used to break down a specific contractual effort by component/task for pricing purposes.; WBS NOMENCLATURE - the actual title associated with the specified WBS number.; and CLIN - the Contract Line Item Number (CLIN) within which the work associated with the specified WBS number should be included for pricing purposes. (See Step 12.) The CLIN is an optional entry, and is required only for CLIN pricing. A sample set of records for this file is shown in Table 1.

TABLE 1
SAMPLE SYSTEM WBS

WBS NUMBER	WBS NOMENCLATURE	CLIN
01	Lamp	AA0001
01.01	Shade	AA0001
01.02	Base	AA0001
01.03	Light Bulb	AA0001
02	Contract Data	AB0000
02.01	Manufacturing Plan	AB0001
02.02	Cost Status Report	AB0002

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in WBS number sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (by WBS number) in the data file. If a 'P' is selected when you are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'D' to delete the record displayed, and proceed to Step 7. Enter a 'U' to undelete a record which was previously marked for deletion. (See Step 7.) Enter an 'A' to add one or more data records to the data file, and proceed to Step 8. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 9. Enter an 'S' to search for a specific WBS number for viewing and/or editing, and proceed to Step 10. Enter an 'R' to return to the main menu and proceed to Step 11. Any entry other than 'N', 'P', 'D', 'U', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 7: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the record from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen (Figure 7). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 6, Figure 6, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 8.) No records are actually physically deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. Records marked for deletion but not permanently deleted will not be

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER: 03

WBS NOMENCLATURE: LAMP

CLIN NUMBER: BA0001


          DO YOU REALLY WISH TO DELETE THIS ENTRY? (Y/N) :Y:
```

FIGURE 7

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER: 03

WBS NOMENCLATURE: LAMP

CLIN NUMBER: BA0001

                  ** RECORD MARKED FOR DELETION **


     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                        P - PREVIOUS RECORD
D - DELETE THIS RECORD                 U - UNDELETE THIS RECORD
A - ADD A RECORD                       M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                R - RETURN TO MAIN MENU

                  ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 8

included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting a 'U' from the menu to undelete the record.

STEP 8: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 9 is presented. The program is written to stay in the 'add' mode until all of the WBS numbers that the user desires to add have been entered. The program has been written to prevent the user from entering multiple entries for the same WBS number. If the user enters a WBS number that already exists in the data file, an error message will be displayed, and the user will be asked to correct the entry. (Figure 10) When the user has entered all of the desired WBS numbers and their associated nomenclature, simply press <return>'s through each of the data fields (i.e., leave the field entries blank), and the program will return the user to Step 6, Figure 6.

STEP 9: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen to display Figure 11. The entire record will be displayed on the screen for any desired changes to be made. Once all desired modifications have been made and the user has pressed <return>'s through all of the data fields, the program will return the user to Step 6, Figure 6.

STEP 10: Entering an 'S' will allow the user to search through the data file for a specific data record to see if

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER:_                                    :

WBS NOMENCLATURE:                                                  :

CLIN NUMBER:          :



              ENTER THE DESIRED WBS NUMBERS AND NOMENCLATURE

          LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 9

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER:01                                   :

WBS NOMENCLATURE:LAMP                                              :

CLIN NUMBER:AA0001    :

     !!! ERROR !!!! - THIS WBS NUMBER ALREADY EXISTS IN THE DATABASE

        PLEASE REENTER OR CHANGE THE EXISTING WBS USING MODIFY

                    * PRESS RETURN TO CONTINUE *
```

FIGURE 10

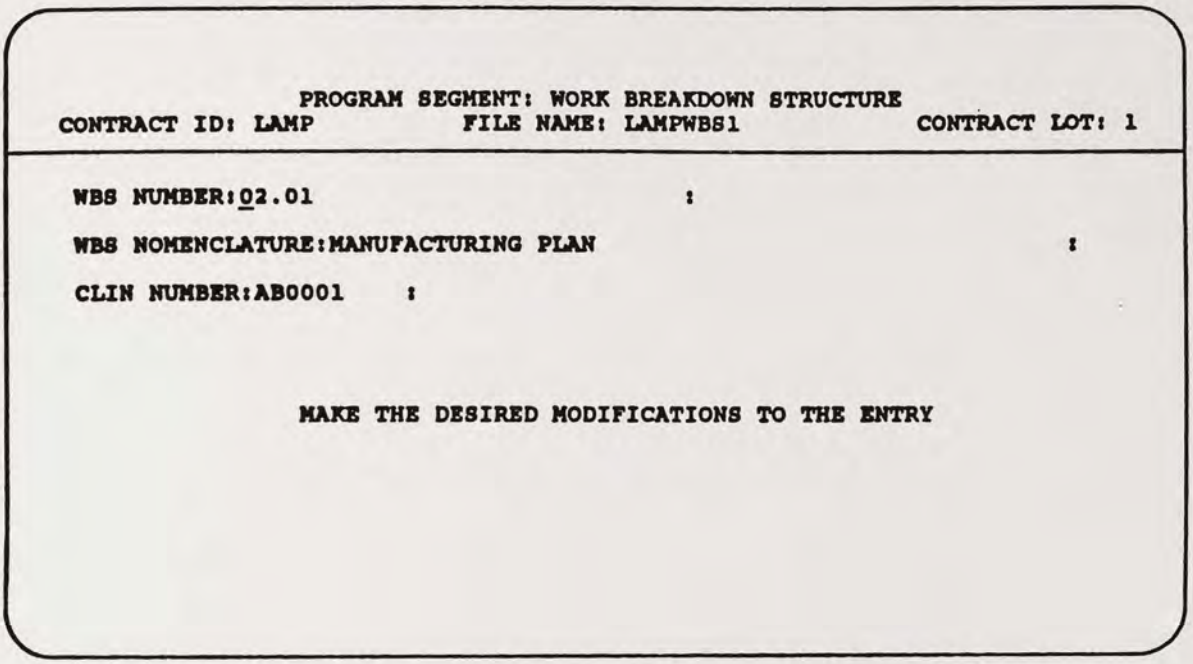


FIGURE 11

it exists, to see if it is correct, or to locate it for modification. When the user enters an 'S', the screen shown in Figure 12 is displayed. This requests the user to enter the WBS number that he/she wishes to locate within the data file. If the desired WBS number is located, that entire record is displayed on the screen, and the user is return to Step 6, Figure 6, to allow him/her to review, modify, or delete the selected record. If the desired WBS number is not located within the data file, an error message is displayed to the user, and the user is asked to enter another WBS number. (See Figure 13.) If the user at this time does not wish to search for another WBS number,

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER:_                                :

WBS NOMENCLATURE:

CLIN NUMBER:

                ENTER THE DESIRED WBS NUMBER TO BE FOUND


     LEAVE THE ENTRY BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 12

```
                PROGRAM SEGMENT: WORK BREAKDOWN STRUCTURE
CONTRACT ID: LAMP          FILE NAME: LAMPWBS1          CONTRACT LOT: 1

WBS NUMBER:04.01                            :

WBS NOMENCLATURE:

CLIN NUMBER:

          THIS WBS NUMBER DOES NOT EXIST IN THE DATABASE

            PRESS RETURN TO ENTER THE NEXT WBS NUMBER
```

FIGURE 13

simply press <return> (i.e., leave the WBS number entry blank) and return to Step 6, Figure 6.

STEP 11: If the user has selected an 'R' to return to the main menu, to program will proceed to one of two possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program's main menu, Step 3, Figure 3. However, if any records were marked for deletion during the WBS enter/edit routine, the screen shown in Figure 14 will be displayed, asking the user if he/she wants to permanently delete the records that they have marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the records marked for deletion from the data file and reindex the data file. A reply of 'N' (no) to this prompt will leave all records in the file, including those marked for deletion. Records marked for deletion will not be included in any reports generated by this program. Any entry other than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry.

STEP 12: Figure 15 shows the screen which will be displayed when the user has selected to enter/edit the CLIN (Contract Line Item Number) and associated nomenclature for the first time for a given contract id and lot number. If the user has selected this option on a file already existing on the disk, the screen shown in Figure 15 will not be displayed, and the user may advance directly to Step 14.

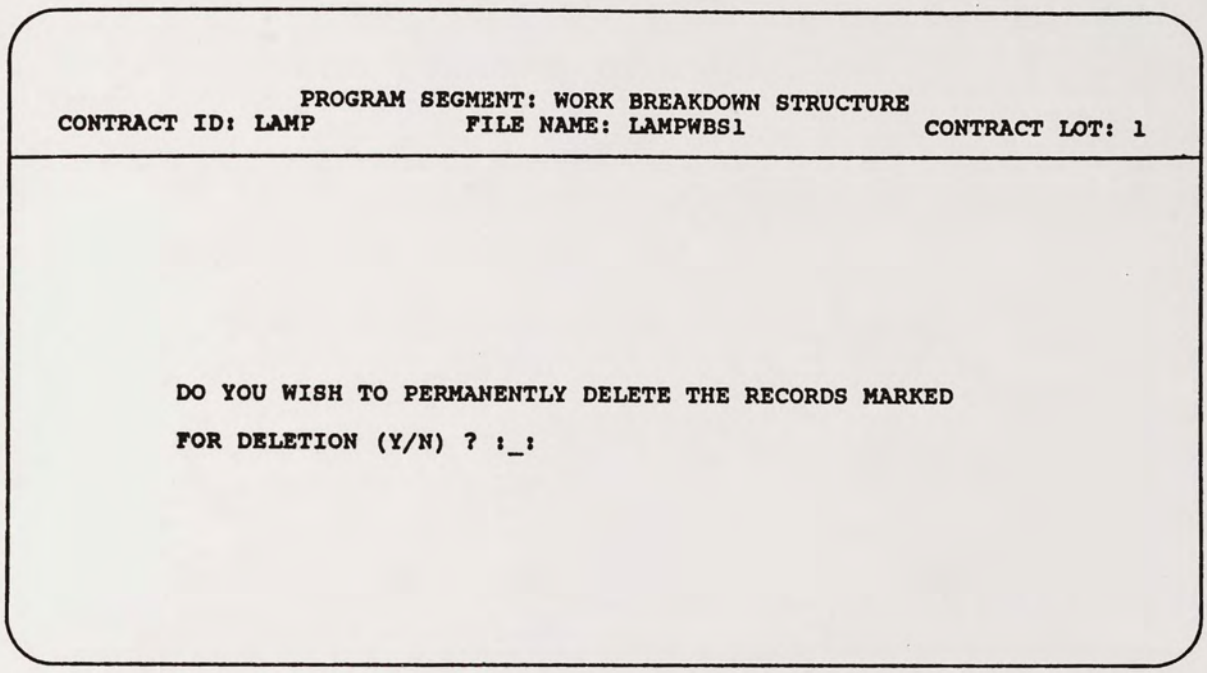


FIGURE 14

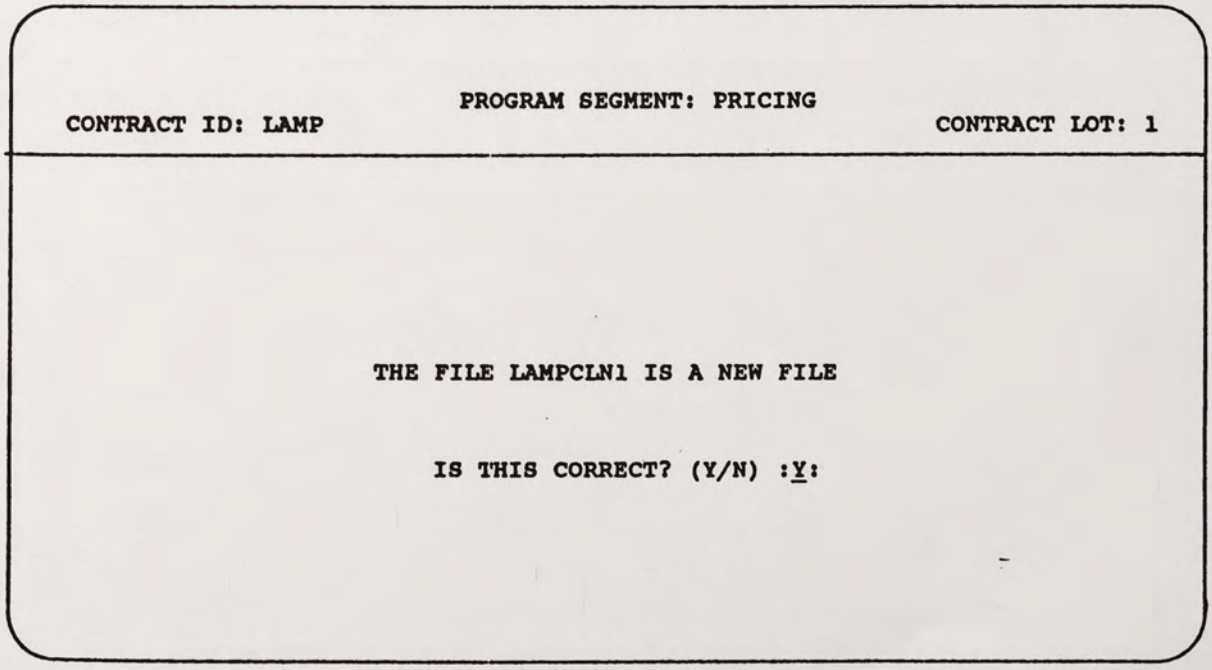


FIGURE 15

When the user has selected a given contract id, lot number, and data file to be edited, this program is set up to check for the existence of the selected file within the active directory. If the file is not found, Figure 15 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' to allow the program to create the new file, and proceed to Step 14. If the file should already exist within the active directory but was not found, enter an 'N' and proceed to Step 13. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and the user will be asked to enter his/her choice again.

STEP 13: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract identifier or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be

located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 3, Figure 3), and then enter another 'R' to return to the operating system and check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 14: Figure 16 shows the screen displayed when the CLIN file has been correctly found and/or created. Note that the center of the second line on the screen displays the name of the data file which will be used in all subsequent CLIN transactions. If the file name displayed is not the data file you wish to be presently working with, return to the main menu (Step 3, Figure 3), and then select an 'F' to change the active file.

This screen, as all of the enter/edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a

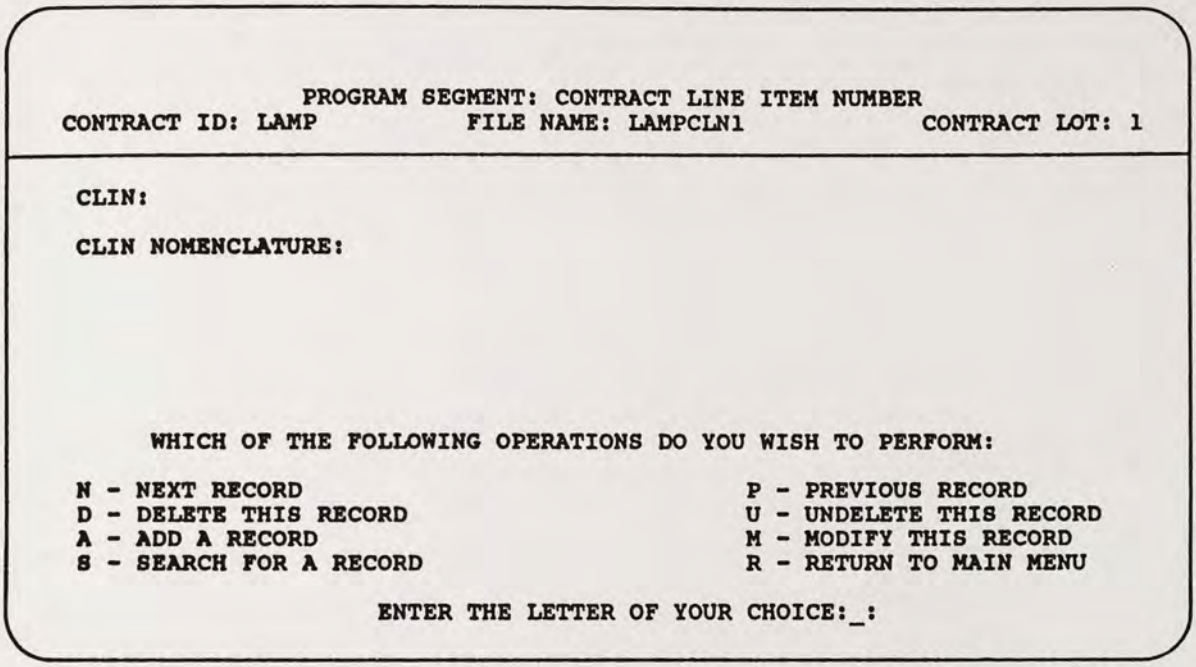


FIGURE 16

blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of possible actions to take on the active data file. When a CLIN data file is selected, the first record displayed is the lowest CLIN number in the file. All records in the file are sorted in ascending order by CLIN number for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: CLIN NUMBER - the alphanumeric sequence used to break down a specific contract by line items (i.e., deliverables) for contract pricing purposes.; CLIN NOMENCLATURE - the actual title

associated with the specified CLIN. A sample set of records for this file is shown in Table 2.

TABLE 2
SAMPLE SYSTEM CLIN DATA

CLIN NUMBER	CLIN NOMENCLATURE
AA0001	Unit 1
AB0001	Manufacturing Plan
AB0002	Cost Status Report

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in CLIN sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in CLIN sequence) in the data file. If a 'P' is selected when you are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'D' to delete the record displayed, and proceed to Step 15. Enter a 'U' to undelete a record which was previously marked for deletion. (See Step 15.) Enter an 'A' to add one or more data records to the data file, and proceed to Step 16. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 17. Enter an 'S' to search for a specific number for viewing and/or editing, and proceed to Step 18. Enter an 'R' to return to the main menu and proceed to Step 19. Any entry other than 'N', 'P', 'D', 'U', 'A', 'M', 'S', or 'R' will

cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 15: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the entry from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen (Figure 17). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 14, Figure 16, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 18.) No records are actually deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting a 'U' from the menu to undelete the record.

STEP 16: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 19 is presented. The program is written to stay in the 'add' mode until all of the CLINs that the user desires to add have been entered. The program has been written to prevent the user from entering multiple entries for the same CLIN. If the user enters a CLIN that already exists

```
                PROGRAM SEGMENT: CONTRACT LINE ITEM NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPCLN1          CONTRACT LOT: 1

CLIN: BA0001

CLIN NOMENCLATURE: UNIT 2



          DO YOU REALLY WISH TO DELETE THIS ENTRY? (Y/N) :Y:
```

FIGURE 17

```
                PROGRAM SEGMENT: CONTRACT LINE ITEM NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPCLN1          CONTRACT LOT: 1

CLIN: BA0001

CLIN NOMENCLATURE: UNIT 2


                    ** RECORD MARKED FOR DELETION **


     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                    ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 18

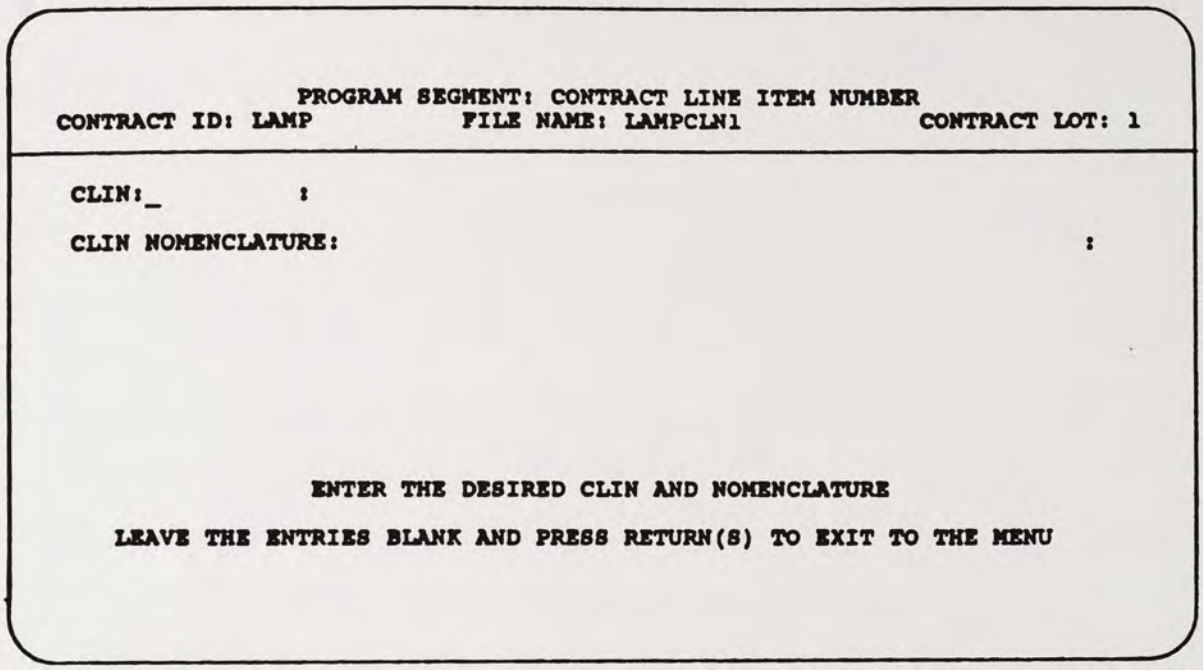


FIGURE 19

in the data file, an error message will be displayed, and the user will be asked to correct the entry. (See Figure 20.) When the user has entered all of the desired CLINs and their associated nomenclature, simply press <return>'s through each of the data fields (i.e., leave the field entries blank), and the program will return the user to Step 14, Figure 16.

STEP 17: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen to display Figure 21. The entire record will be displayed on the screen for any desired changes to be made. Once all of the desired modifications have been made, the program will return the user to Step 14, Figure 16.

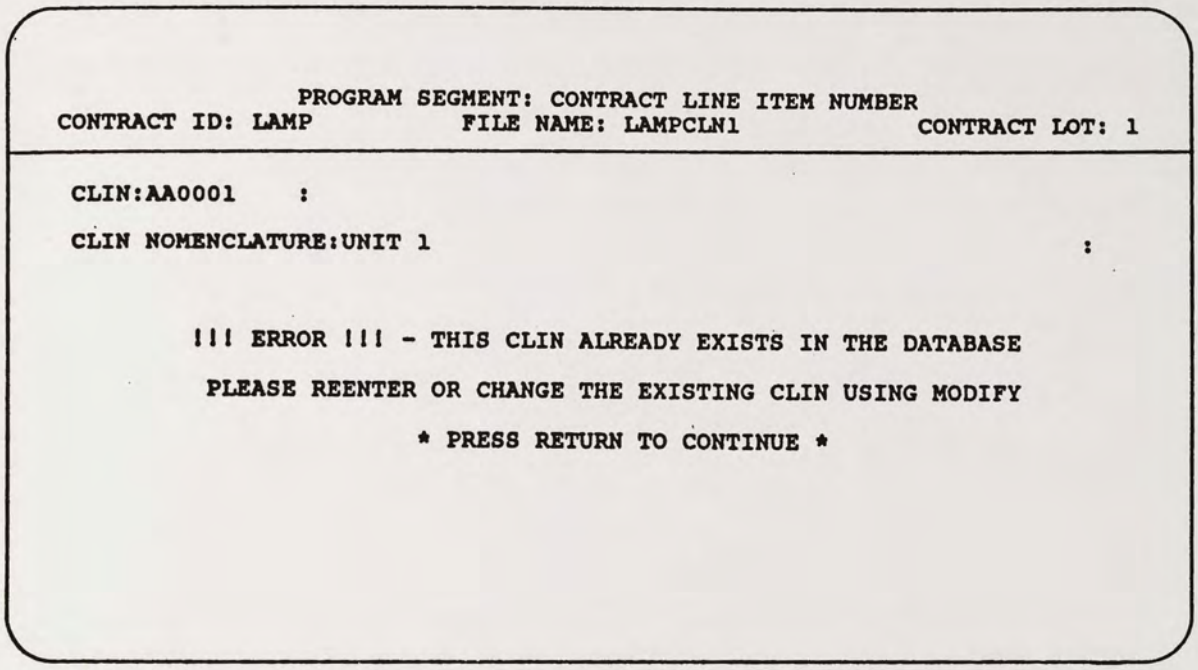


FIGURE 20

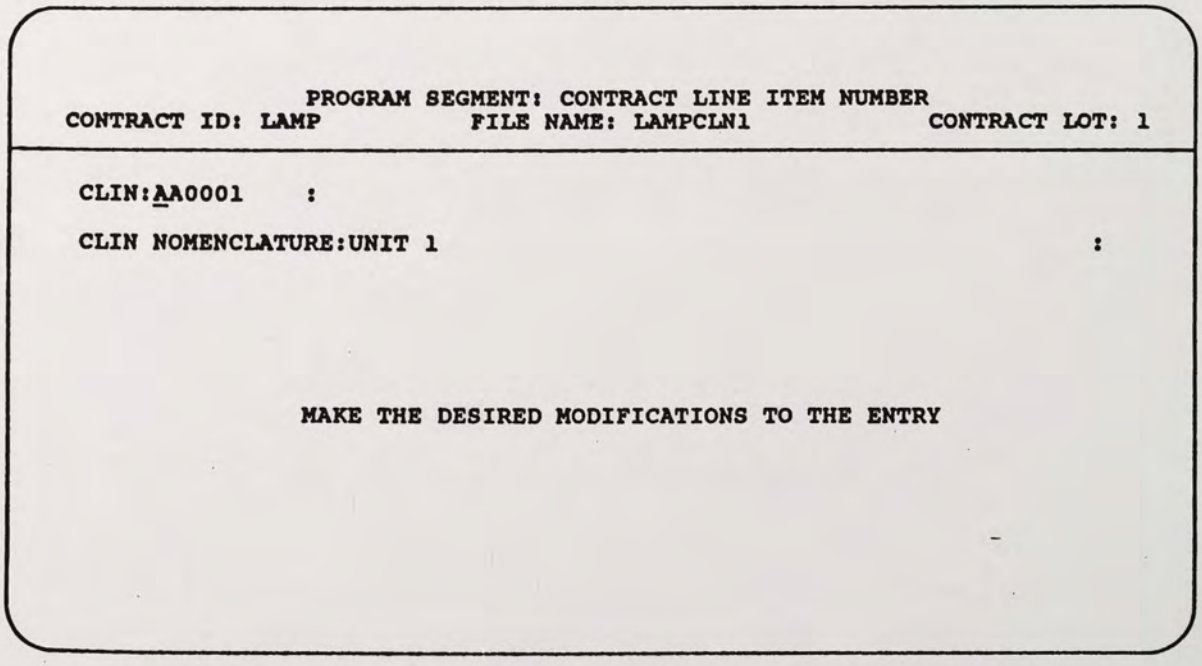


FIGURE 21

STEP 18: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for modification. When the user enters an 'S', the screen shown in Figure 22 is displayed. This screen requests the user to enter the CLIN that he/she wishes to locate within the data file. If the desired CLIN is located, that entire record is displayed on the screen, and the user is returned to Step 14, Figure 16, to allow him/her to review, modify, or delete the selected record. If the desired CLIN is not located within the data file, an error message is displayed to the user, and the user is asked to enter another CLIN. (See Figure 23.) If the user at this time does not wish to search for another CLIN, simply press <return> (i.e., leave the CLIN entry blank) and return to Step 14, Figure 16.

STEP 19: If the user has selected an 'R' to return to the main menu, the program will proceed to one of two possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program main menu, Step 3, Figure 3. However, if any records were marked for deletion during the CLIN enter/edit routine, the screen shown in Figure 24 will be displayed, asking the user if he/she wants to permanently delete the records that they have marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the

```
                PROGRAM SEGMENT: CONTRACT LINE ITEM NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPCLN1          CONTRACT LOT: 1

CLIN:_          :

CLIN NOMENCLATURE:



                    ENTER THE DESIRED CLIN TO BE FOUND



      LEAVE THE ENTRY BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 22

```
                PROGRAM SEGMENT: CONTRACT LINE ITEM NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPCLN1          CONTRACT LOT: 1

CLIN:BB0001     :

CLIN NOMENCLATURE:



                    THIS CLIN DOES NOT EXIST IN THE DATABASE

                PRESS RETURN TO ENTER THE NEXT CLIN NUMBER
```

FIGURE 23

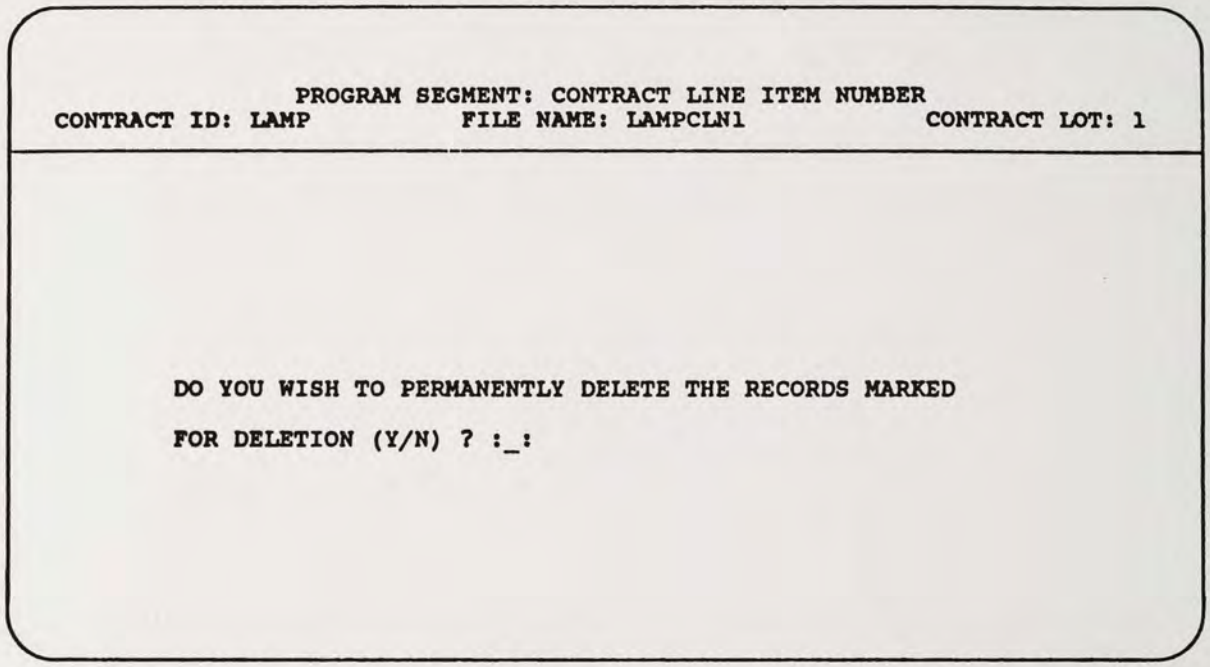


FIGURE 24

records marked for deletion from the data file, reindex the data file, and then return the user to Step 3, Figure 3. A reply of 'N' (no) to this prompt will leave all records in the file, including those marked for deletion. Any entry than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry. Records marked for deletion will not be included in any reports generated by this program.

STEP 20: Figure 25 shows the screen which will be displayed when the user has selected to enter/edit the ACCT (Cost Account) and associated nomenclature for the first time for a given contract identifier and lot number. If

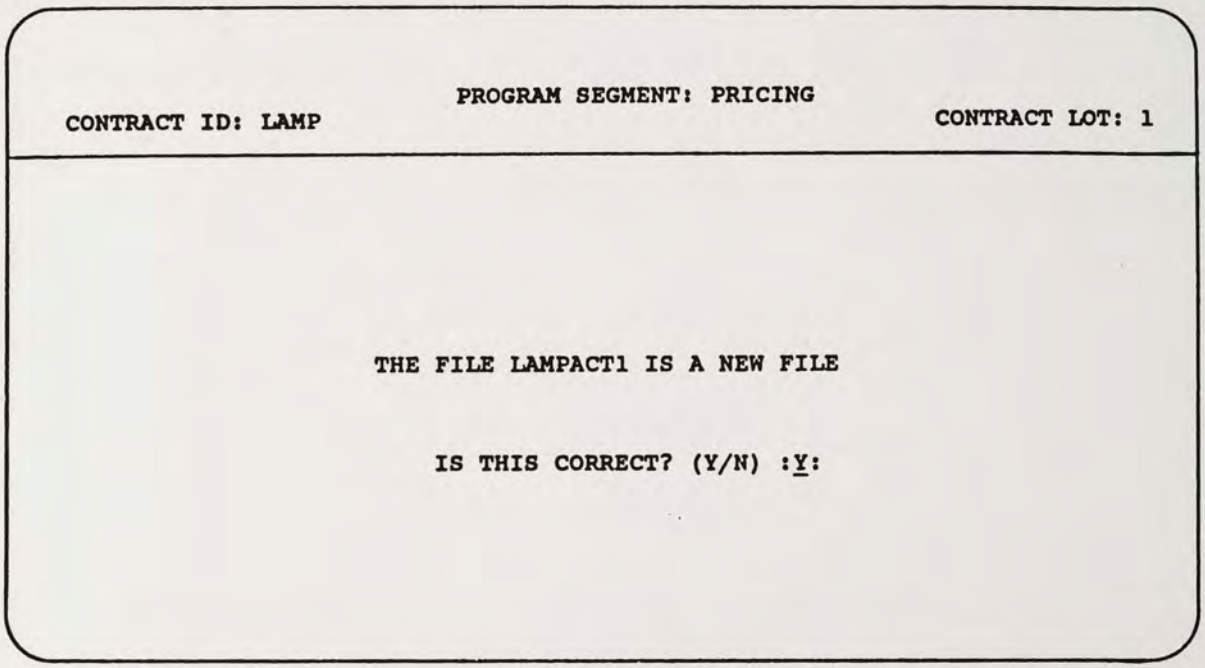


FIGURE 25

the user has selected this option on a file already existing on the disk, the screen shown in Figure 25 will not be displayed, and the user may advance directly to Step 22.

When the user has selected a given contract and lot number of the data file to be edited, this program is set up to check for the existence of the selected file within the active directory. If the file is not found, Figure 25 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' (yes) to allow the program to create the new file, and proceed to Step 22. If the file should

already exist within the active directory but was not found, enter an 'N' (no) and proceed to Step 21. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and the user will be asked to enter his/her choice again.

STEP 21: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract id or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 3, Figure 3), and then enter another 'R' to return to the operating

system and check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 22: Figure 26 shows the screen displayed when the ACCT file has been correctly found and/or created. Note that the center of the second line on the screen displays the name of the data file which will be used in all subsequent ACCT transactions. If the file name displayed is not the data file you wish to be presently working with, return to the main menu (Step 3, Figure 3), and then select an 'F' to change the active file.

```
                    PROGRAM SEGMENT: ACCOUNT NUMBER
CONTRACT ID: LAMP        FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER:                        D(OLLARS) OR H(OURS):

ACCT NOMENCLATURE:

     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 26

This screen, as all of the enter/edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of possible actions to take on the active data file. When an ACCT data file is selected, the first record displayed is the lowest ACCT number in the file. All records in the file are sorted in ascending order by ACCT number for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: ACCT NUMBER - the alphanumeric sequence used to break down a work effort by cost account for pricing purposes.; ACCT NOMENCLATURE - the actual title associated with the specific cost account.; D(OLLARS) OR H(OURS) - a one character designator where 'D' indicates that the ACCT in a dollar account and an 'H' indicates that the ACCT is an hours account. A sample set of records for this file is shown in Table 3.

TABLE 3
SAMPLE SYSTEM ACCT DATA

ACCT NUMBER	ACCT NOMENCLATURE	(H)OURS/(D)OLLARS
10A	Purchased Parts	D
10B	Subcontractor	D
20A	Electrical Engineering	H
20B	Manufacturing Assembly	H
20C	Packing and Shipping	H

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in ACCT number sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in ACCT number sequence) in the data file. If a 'P' is selected when you are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'D' to delete the record displayed, and proceed to Step 23. Enter a 'U' to undelete a record which was previously marked for deletion. (See Step 23.) Enter an 'A' to add one or more data records to the data file, and proceed to Step 24. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 25. Enter an 'S' to search for a specific ACCT number for viewing and/or editing, and proceed to Step 26. Enter an 'R' to return to the main menu and proceed to Step 27. Any entry other than 'N', 'P', 'D', 'U', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 23: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the entry from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen

(Figure 27). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 22, Figure 26, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 28.) No records are actually deleted from the data file until the user returns to the main menu, they are simply marked to be deleted at this time. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specified record can be removed by selecting a 'U' from the menu to undelete the record.

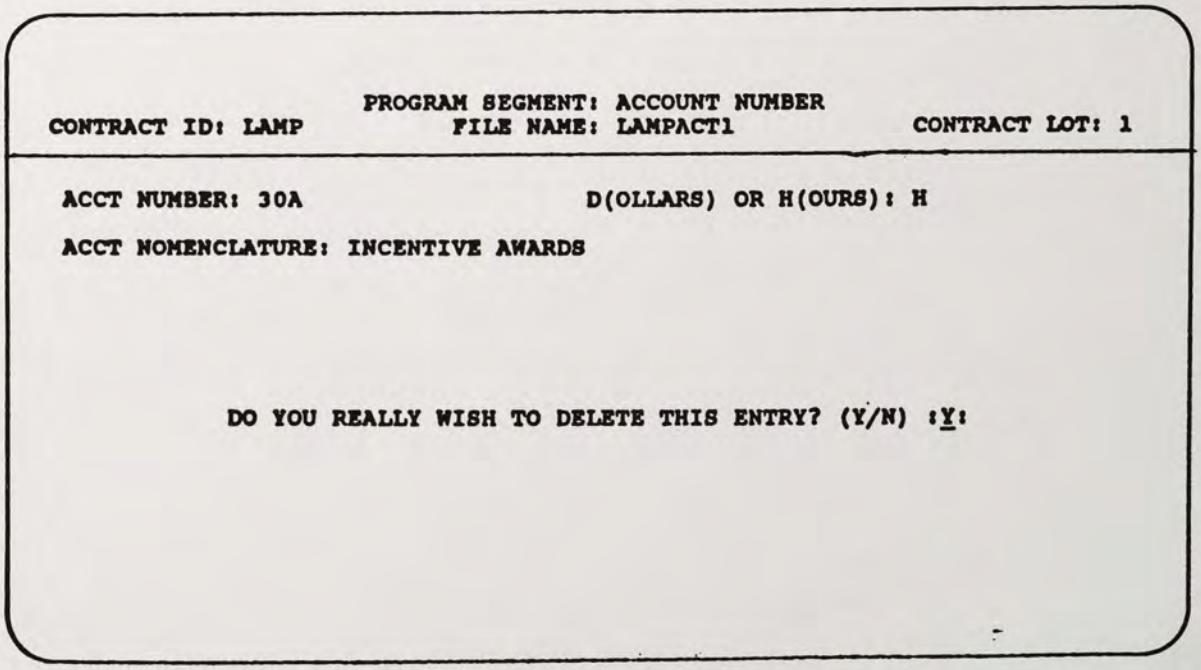


FIGURE 27

```
                    PROGRAM SEGMENT: ACCOUNT NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER: 30A                    D(OLLARS) OR H(OURS): H

ACCT NOMENCLATURE: INCENTIVE AWARDS


                  ** RECORD MARKED FOR DELETION **


     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                  ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 28

STEP 24: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 29 is presented. The program is written to stay in the 'add' mode until all of the ACCT numbers that the user desires to add have been entered. The program has been written to prevent the user from entering multiple entries for the same ACCT number. If the user enters an ACCT number that already exists in the data file, an error message will be displayed, and the user will be asked to correct the entry. (See Figure 30.) When the user has entered all of the desired ACCT numbers and their associated nomenclature, simply press <return>'s through

```
                        PROGRAM SEGMENT: ACCOUNT NUMBER
CONTRACT ID: LAMP             FILE NAME: LAMPACT1              CONTRACT LOT: 1

ACCT NUMBER:_     :                  D(OLLARS) OR H(OURS): :
ACCT NOMENCLATURE:                                 :

            ENTER THE DESIRED ACCT NUMBERS AND NOMENCLATURE
        LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 29

```
                        PROGRAM SEGMENT: ACCOUNT NUMBER
CONTRACT ID: LAMP             FILE NAME: LAMPACT1              CONTRACT LOT: 1

ACCT NUMBER:10A   :                  D(OLLARS) OR H(OURS):D
ACCT NOMENCLATURE:PURCHASED PARTS                  :

      !!! ERROR !!! - THIS ACCOUNT NUMBER ALREADY EXISTS IN THE DATABASE
          PLEASE REENTER OR CHANGE THE EXISTING ACCT USING MODIFY
                        * PRESS RETURN TO CONTINUE *
```

FIGURE 30

each of the data fields (i.e., leave the field entries blank), and the program will return the user to Step 22, Figure 26.

STEP 25: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen to display Figure 31. The entire record will be displayed on the screen for any desired changes to be made. Once all desired modifications have been made, the program will return the user to Step 22, Figure 26.

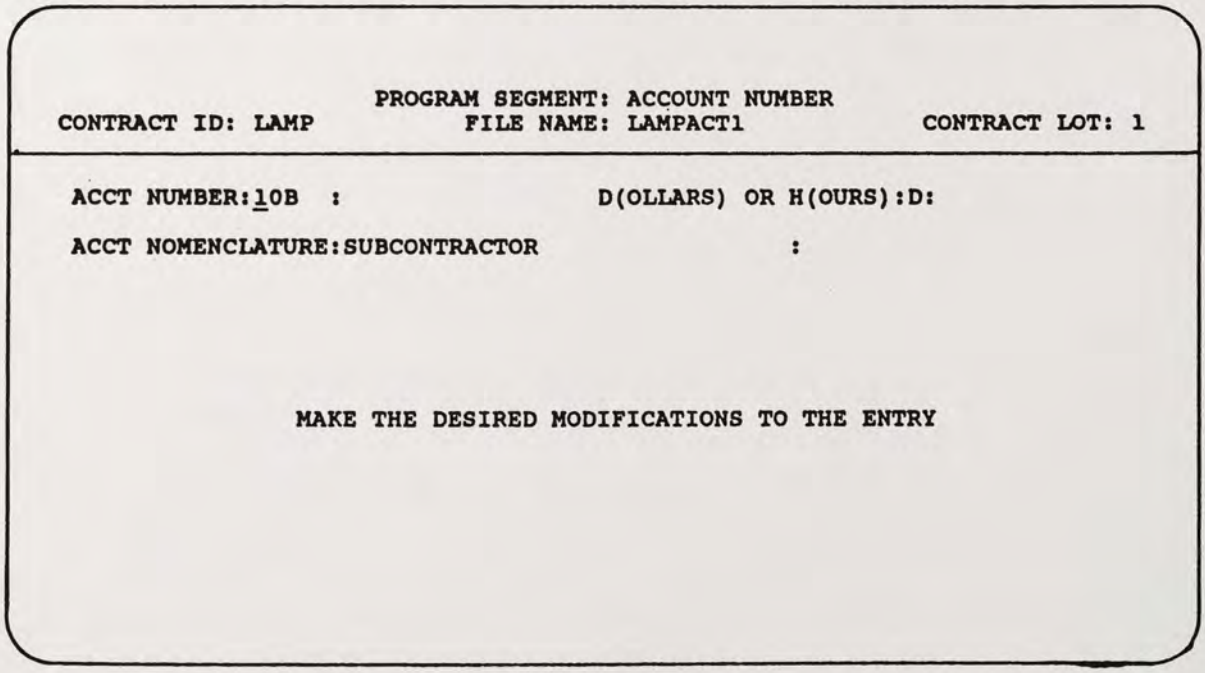


FIGURE 31

STEP 26: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for modification. When the user enters an 'S', the screen

shown in Figure 32 is displayed. This requests the user to enter the ACCT number that he/she wishes to locate within the data file. If the desired ACCT number is located, that entire record is displayed on the screen, and the user is returned to Step 22, Figure 26, to allow him/her to review, modify, or delete the selected record. If the desired ACCT number is not located within the data file, an error message is displayed and the user is asked to enter another ACCT number. (See Figure 33.) If the user at this time does not wish to search for another ACCT number, simply press <return> (i.e., leave the ACCT number entry blank) and return to Step 22, Figure 26.

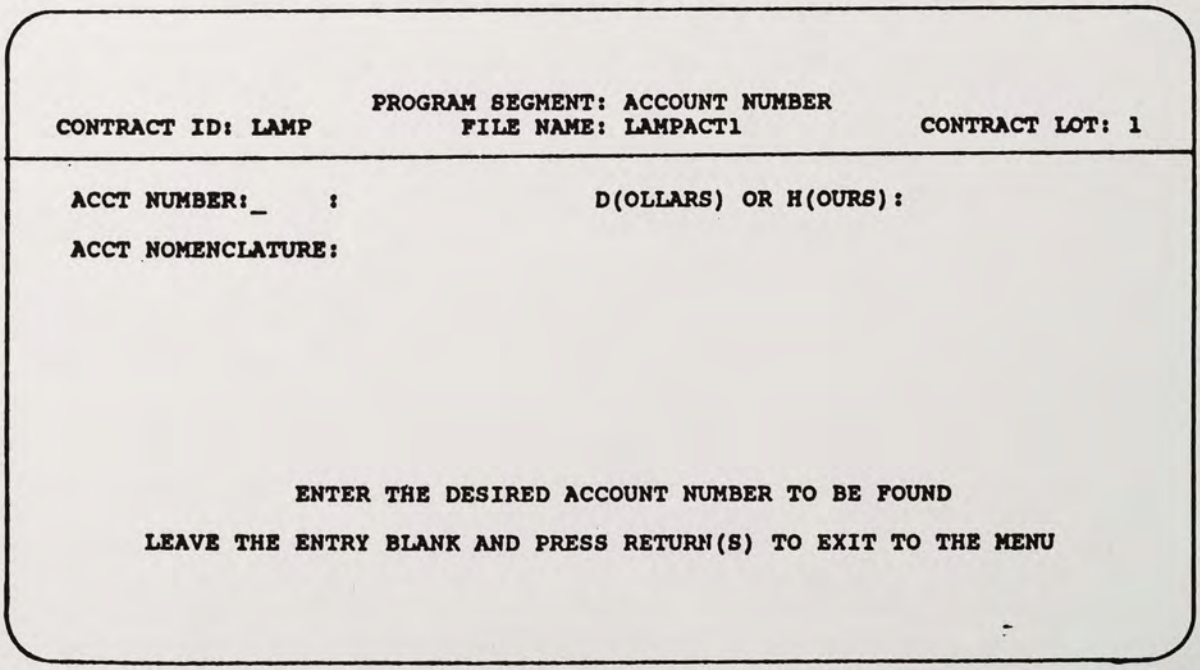


FIGURE 32

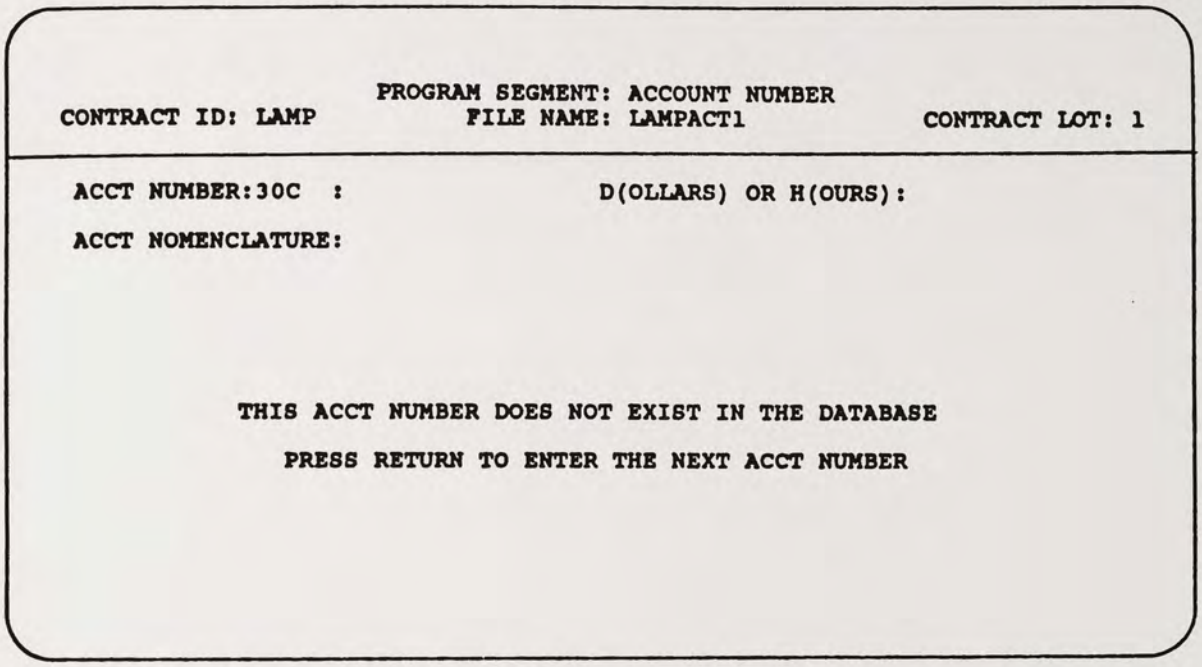


FIGURE 33

STEP 27: If the user has selected an 'R' to return to the main menu, to program will proceed to one of two possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program main menu, Step 3, Figure 3. However, if any records were marked for deletion during the ACCT enter/edit routine, the screen shown in Figure 34 will be displayed, asking the user if he/she wants to permanently delete the records that they have marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the records marked for deletion from the data file, reindex the data file, and then return the user to Step 3, Figure 3. A

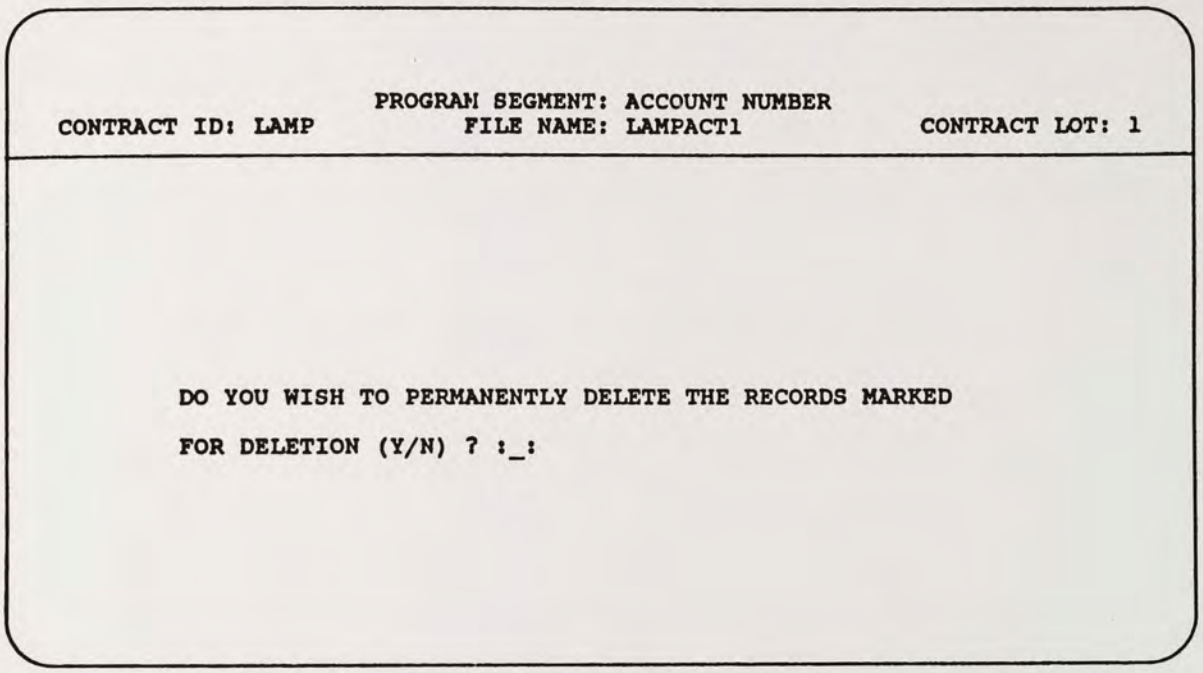


FIGURE 34

reply of 'N' (no) to this prompt will leave all records in the file, including those marked for deletion. Any entry other than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting a 'U' from the menu to undelete the record.

STEP 28: Figure 35 shows the screen which will be displayed when the user has selected to enter/edit the DEPT (Department) and associated nomenclature for the first time

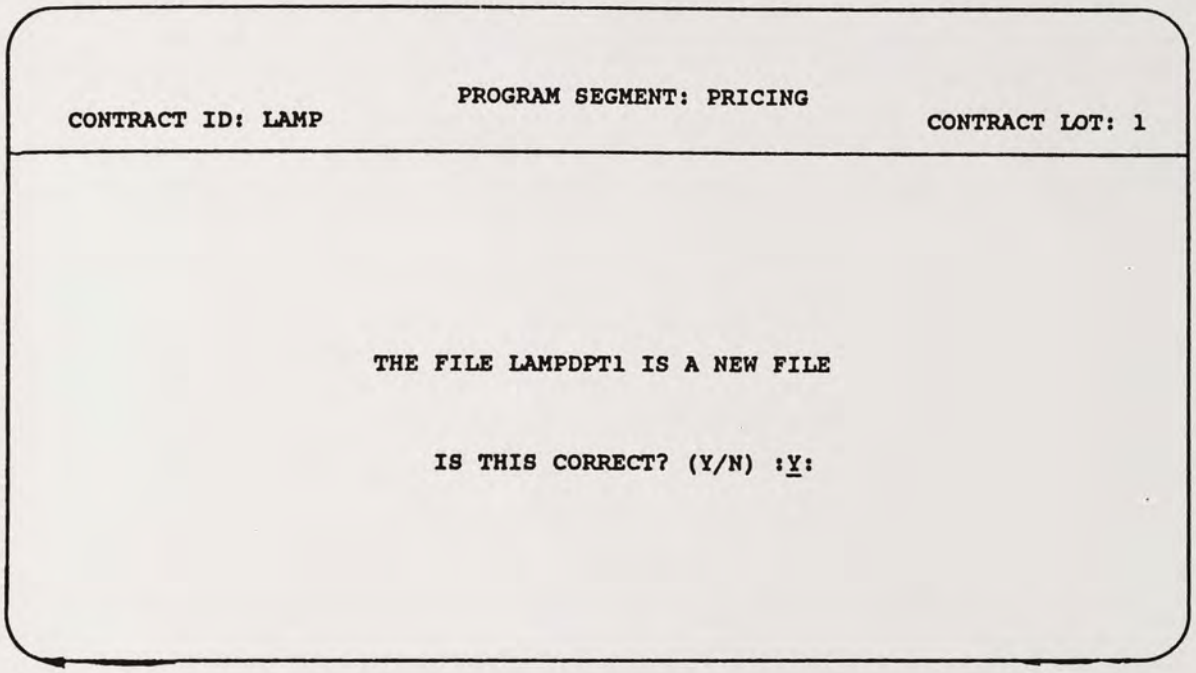


FIGURE 35

for a given contract identifier and lot number. If the user has selected this option on a file already existing on the disk, the screen shown in Figure 35 will not be displayed, and the user may advance directly to Step 30.

When the user has selected a given contract id, lot number, and data file to be edited, this program is set up to check for the existence of the selected file within the active directory. If the file is not found, Figure 35 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' (yes) to allow the program to create the new file, and proceed to Step 30. If the file should already

exist within the active directory but was not found, enter an 'N' (no) and proceed to Step 29. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and the user will be asked to enter his/her choice again.

STEP 29: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract id or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 3, Figure 3), and then enter a 'Q' to quit to the operating system and

check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 30: Figure 36 shows the screen displayed when the DEPT file has been correctly found and/or created. Note that the center of the second line on the screen displays the name of the data file which will be used in all subsequent DEPT transactions. If the file name displayed is not the data file you wish to be presently working with, return to the main menu (Step 3, Figure 3), and then select an 'F' to change the active file.

```
                    PROGRAM SEGMENT: DEPARTMENT NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPDPT1          CONTRACT LOT: 1

DEPT:

DEPT NOMENCLATURE:




     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 36

This screen, as all of the enter/edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of possible actions to take on the active data file. When a DEPT data file is selected, the first record displayed is the lowest DEPT number in the file. All records in the file are sorted in ascending order by DEPT number for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: DEPT - the alphanumeric sequence used to identify the various departments within a corporation where specific sections of the contractual work effort will be performed.; DEPT NOMENCLATURE - the actual title associated with the specified DEPT. A sample set of records for this file is shown in Table 4.

TABLE 4
SAMPLE SYSTEM DEPT DATA

DEPT	DEPT NOMENCLATURE
500	Systems Engineering
501	Manufacturing/Distribution
502	Small Purchase

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in DEPT sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in DEPT sequence) in the data file. If a 'P' is selected when you are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'D' to delete the record displayed, and proceed to Step 31. Enter a 'U' to undelete a record which was previously marked for deletion. (See Step 31.) Enter an 'A' to add one or more data records to the data file, and proceed to Step 32. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 33. Enter an 'S' to search for a specific DEPT for viewing and/or editing, and proceed to Step 34. Enter an 'R' to return to the main menu and proceed to Step 35. Any entry other than 'N', 'P', 'D', 'U', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 31: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the entry from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen

(Figure 37). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 30, Figure 36, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 38.) No records are actually deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting a 'U' from the menu to undelete the record.

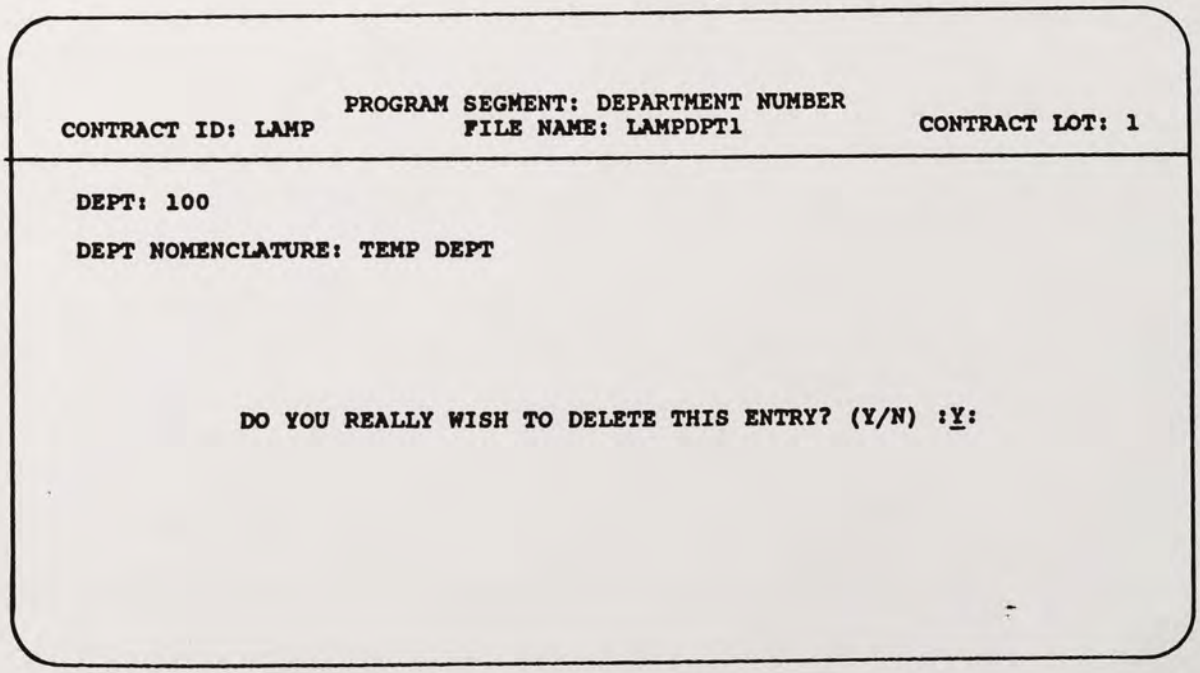


FIGURE 37

```
                    PROGRAM SEGMENT: DEPARTMENT NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPDPT1          CONTRACT LOT: 1

DEPT: 100

DEPT NOMENCLATURE: TEMP DEPT

                    ** RECORD MARKED FOR DELETION **

     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                    ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 38

STEP 32: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 39 is presented. The program is written to stay in the 'add' mode until all of the DEPTs that the user desires to add have been entered. The program has been written to prevent the user from entering multiple entries for the same DEPT. If the user enters a DEPT that already exists in the data file, an error message will be displayed, and the user will be asked to correct the entry. (Figure 40) When the user has entered all of the desired DEPT and their associated nomenclature, simply press <return>'s through each of the data fields (i.e., leave the field entries

```
                    PROGRAM SEGMENT: DEPARTMENT NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPDPT1          CONTRACT LOT: 1

DEPT:_     :

DEPT NOMENCLATURE:                                    :

                ENTER THE DESIRED DEPARTMENTS AND NOMENCLATURE

          LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 39

```
                    PROGRAM SEGMENT: DEPARTMENT NUMBER
CONTRACT ID: LAMP          FILE NAME: LAMPDPT1          CONTRACT LOT: 1

DEPT:500   :

DEPT NOMENCLATURE:SYSTEMS ENGINEERING                 :

   !!! ERROR !!! - THIS DEPARTMENT ALREADY EXISTS IN THE DATABASE

        PLEASE REENTER OR CHANGE THE EXISTING DEPT USING MODIFY

                    * PRESS RETURN TO CONTINUE *
```

FIGURE 40

blank), and the program will return the user to Step 30, Figure 36.

STEP 33: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen to display Figure 41. The entire record will be displayed on the screen for any desired changes to be made. Once all desired modifications have been made, the program will return the user to Step 30, Figure 36.

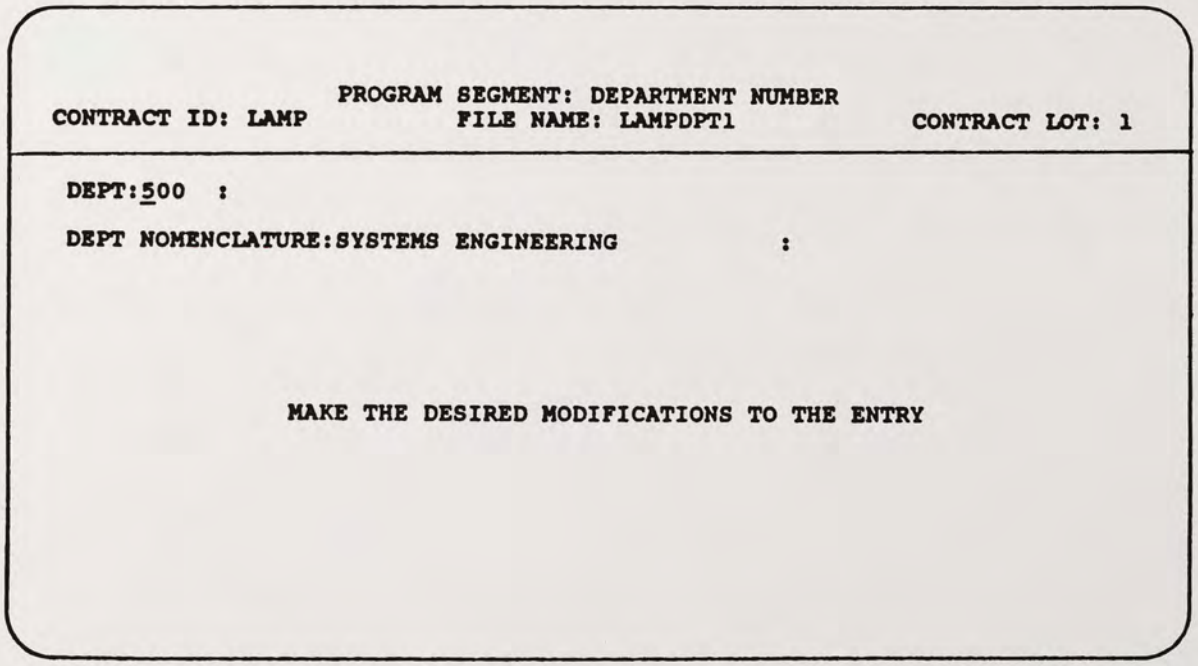


FIGURE 41

STEP 34: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for modification. When the user enters an 'S', the screen shown in Figure 42 is displayed. This requests the user to

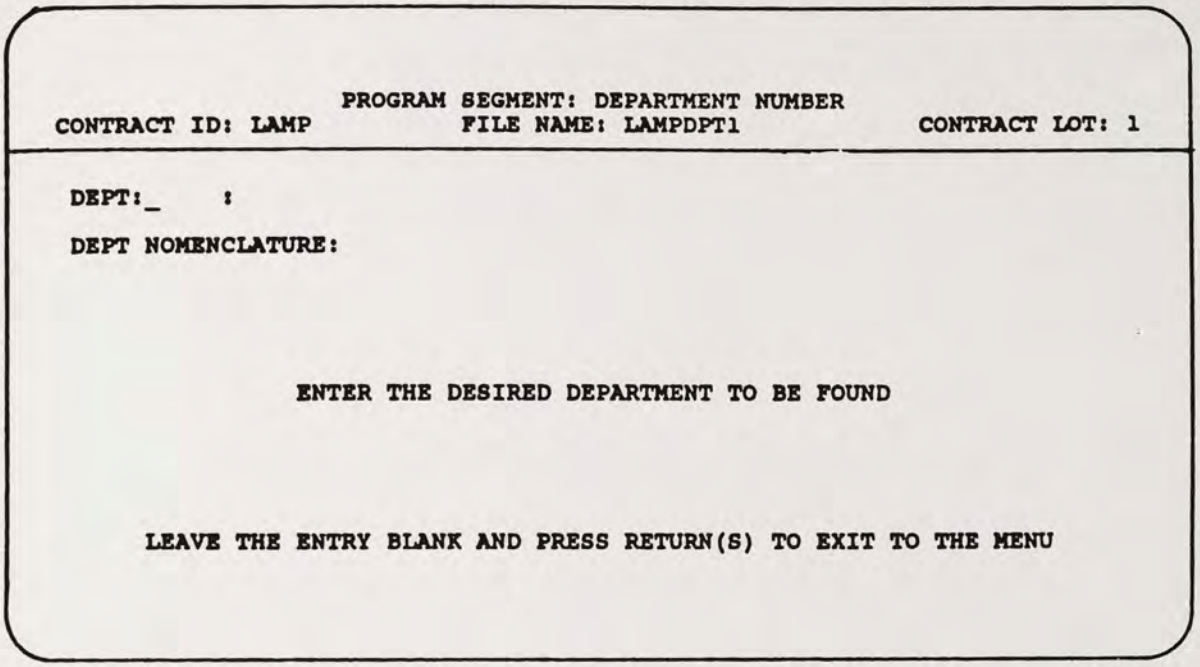


FIGURE 42

enter the DEPT number that he/she wishes to locate within the data file. If the desired DEPT number is located, that entire record is displayed on the screen, and the user is returned to Step 30, Figure 36, to allow him/her to review, modify, or delete the selected record. If the desired DEPT number is not located within the data file, an error message is displayed to the user, and the user is asked to enter another DEPT number. (See Figure 43.) If the user at this time does not wish to search for another DEPT number, simply press <return> (i.e., leave the DEPT entry blank) and return to Step 30, Figure 36.

STEP 35: If the user has selected an 'R' to return to the main menu, the program will proceed to one of two

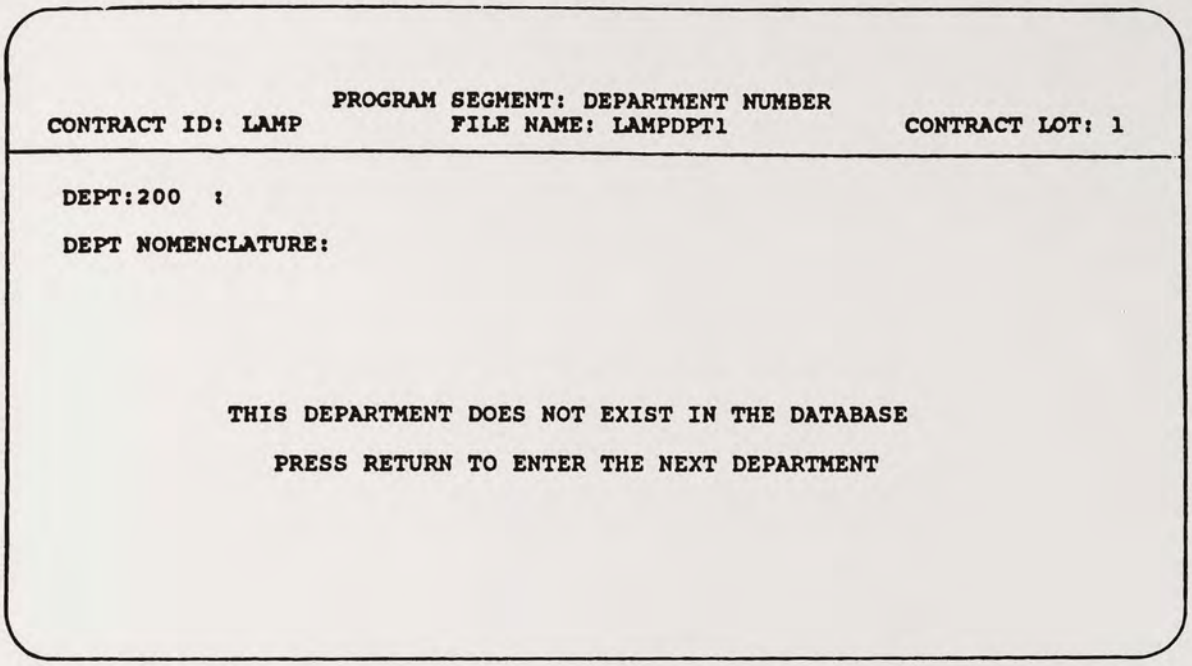


FIGURE 43

possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program main menu, Step 3, Figure 3. However, if any records were marked for deletion during the DEPT enter/edit routine, the screen shown in Figure 44 will be displayed, asking the user if he/she wants to permanently delete the records that they have marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the records marked for deletion from the data file, reindex the data file, and then return the user to Step 3, Figure 3. A reply of 'N' (no) to this prompt will leave all records in the file, including those marked for deletion. Any entry

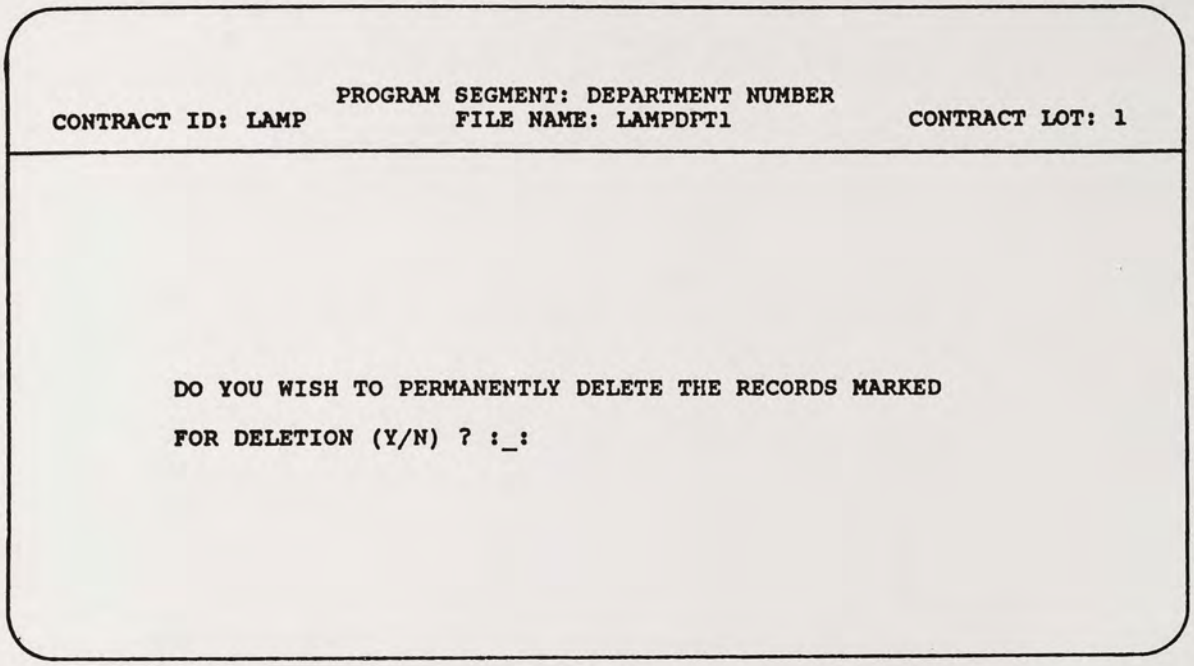


FIGURE 44

other than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program.

STEP 36: Figure 45 shows the screen which will be displayed when the user has selected to enter/edit labor rates with the associated account numbers, providing the account numbers have already been entered into the ACCT number file. If the account numbers have not been entered, the message shown in Figure 46 will be displayed on the screen, and the user will be requested to go back and

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER: 10A  PURCHASED PARTS

DOLLAR ACCOUNT - NO LABOR RATE



     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:

N - NEXT RECORD                          P - PREVIOUS RECORD
A - ADD THE LABOR RATES                  M - MODIFY THE LABOR RATE
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU

                ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 45

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1



     THE FILE "LAMPACT1" MUST EXIST ON THE DISK BEFORE LABOR
     RATES CAN BE ENTERED.

     PLEASE ENTER/COPY THE ACCT FILE ON THE DISK TO CONTINUE

               ** PRESS RETURN TO CONTINUE **
```

FIGURE 46

locate or enter the account numbers and their associated nomenclature in the ACCT number file before attempting to enter the labor rates. No labor rates can be entered until the ACCT number file is located, and the user is returned to Step 3, Figure 3.

Figure 45 shows the screen displayed when the ACCT file has been correctly located, and the first ACCT number within that file is a dollar account. Figure 47 shows the screen displayed when the ACCT number within that file is an hour account. Note that on both of these screen displays, the center of the second line displays the name of the data file which will be used in all subsequent labor rate transactions. If the file name displayed in not the data file you wish to be presently working with, return to the main menu (Step 3, Figure 3), and then select 'F' to change the active file.

These screens, as all of the enter/edit data screens, are set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, filename), the center section displaying a specific entry within the data file, and the bottom section displaying a menu of possible actions to take on the active data file. When the ACCT data file is selected for the entering of labor rates, the first record displayed is the lowest ACCT number in the file. All

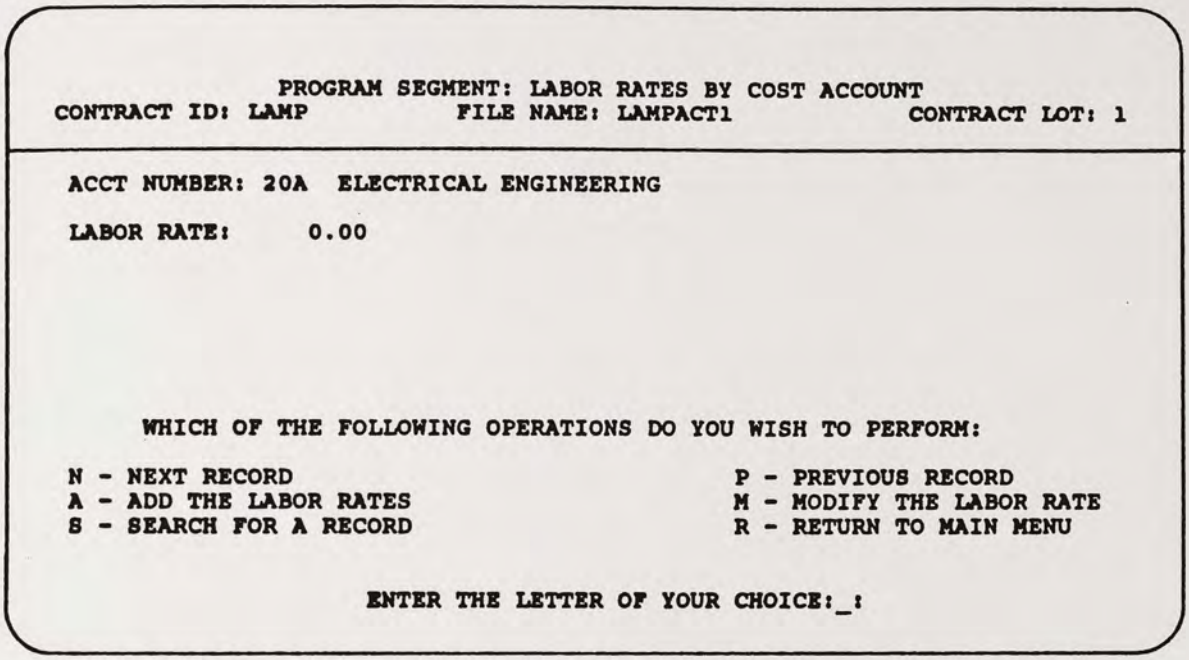


FIGURE 47

records in the file are sorted in ascending order by ACCT number for display purposes.

Within the center section of the screen, the data fields displayed in Figure 47 are described as follows: ACCT NUMBER - the alphanumeric sequence used to break down a work effort by cost account for pricing purposes, as well as the actual title associated with the specific cost account.; LABOR RATE - the average rate, in dollars per hour, which the individual(s) working on this contractual effort will be paid during the contract's period-of-performance. Note that in Figure 45, if an ACCT number was identified as a dollar account, the message "DOLLAR ACCOUNT

- NO LABOR RATE" will be displayed on the screen in lieu of an actual labor rate. A sample set of records for this file is shown in Table 5.

TABLE 5
SAMPLE SYSTEM LABOR RATES

ACCT NUMBER	ACCT NOMENCLATURE	LABOR RATE
10A	Purchased Parts	None
10B	Subcontracts	None
20A	Electrical Engineering	32.75
20B	Manufacturing Assembly	22.30
20C	Packing and Shipping	20.60

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in ACCT number sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in ACCT number sequence) in the data file. If a 'P' is selected when you are in at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed. It should be noted that if an ACCT number record was marked for deletion under the enter/edit ACCT numbers and nomenclature section of this program, but was not permanently deleted, those record(s) marked for deletion will also show up while entering the labor rates they will be displayed with the message '** RECORD MARKED FOR DELETION **', but will not be used in any of the reports generated.

Enter an 'A' to add one or more labor rates to the data file, and proceed to Step 37. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 38. Enter an 'S' to search for a specific ACCT number to view and/or edit its associated labor rate and proceed to Step 39. Enter an 'R' to return to the main menu and return to Step 3. Any entry other than 'N', 'P', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 37: When the user selects an 'A' to add one or more labor rates to the data file, the screen displayed in Figure 48 is presented. Once the user has entered the ACCT number to which a labor rate is to be added, the program will go out to the ACCT data file and the specified ACCT number and nomenclature, present it on the screen, and then prompt the user to enter the labor rate that is to be used for the specified ACCT number. (See Figure 49.) Once the labor rate has been entered, the screen display will prompt the user for the next ACCT number (Figure 48) to which a labor rate is to be added. The program is written to stay in the 'add' mode until all of the labor rates that the user desires to add have been entered. When the user has entered all of the desired labor rates, simply press <return> through the ACCT number data field (i.e., leave

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER:_     :

        ENTER THE ACCT NUMBER YOU WISH TO ADD A LABOR RATE TO
        LEAVE THE ENTRY BLANK AND PRESS RETURN TO EXIT TO THE MENU
```

FIGURE 48

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER: 20A    ELECTRICAL ENGINEERING
LABOR RATE:_   0.00:

        ENTER THE ACCT NUMBER YOU WISH TO ADD A LABOR RATE TO
        LEAVE THE ENTRY BLANK AND PRESS RETURN TO EXIT TO THE MENU
```

FIGURE 49

the field entry blank), and the program will return the user to Step 36, Figure 47.

STEP 38: Entering an 'M' in response to the menu to modify the labor rate displayed on the screen will cause the program to display Figure 50. The labor rate will be presented on the screen for any desired changes to be made. Once the desired modification has been made, the program will return the user to Step 36, Figure 47.

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER: 20C    PACKING AND SHIPPING
LABOR RATE:_ 20.60:

                MAKE THE DESIRED MODIFICATIONS TO THE ENTRY
```

FIGURE 50

STEP 39: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for modifications. When the user enters an 'S', the screen shown in Figure 51 is displayed. This requests the user to enter the ACCT number that he/she wishes to locate within

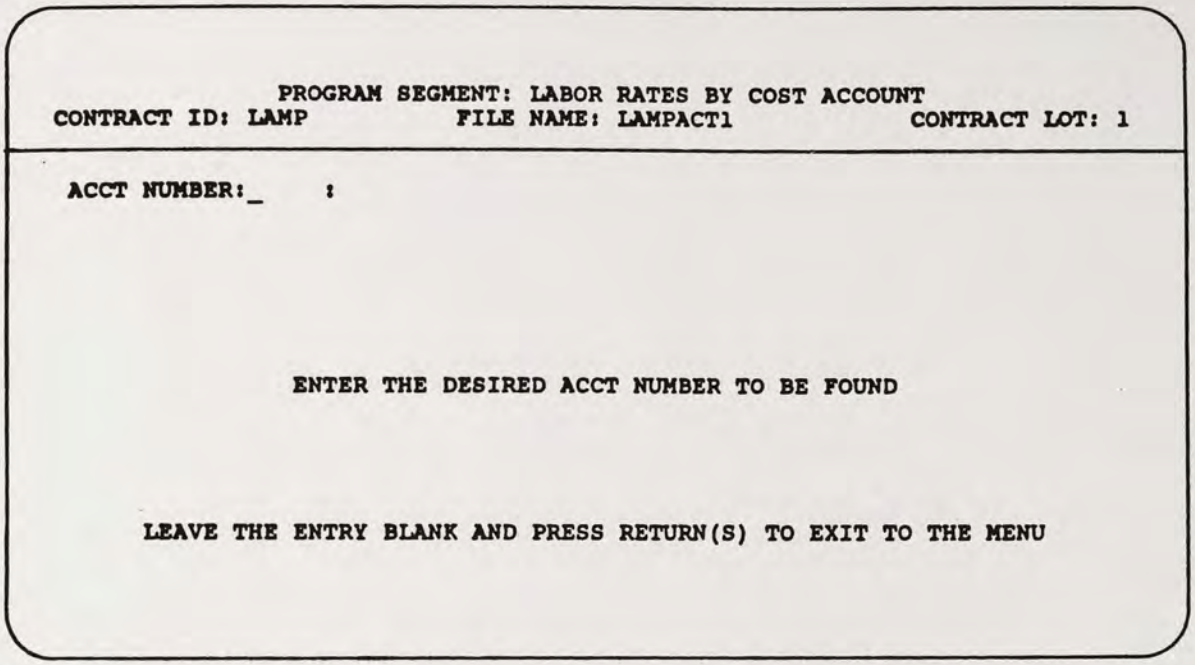


FIGURE 51

the data file. If the desired ACCT number is located, the ACCT number, nomenclature, and labor rate (if any) are displayed on the screen, and the user is returned to Step 36, Figure 47, to allow him/her to review or modify the selected record. If the desired ACCT number is not located within the data file, an error message is displayed to the user, and the user is asked to enter another ACCT number. (See Figure 52.) If the user at this time does not wish to search for another ACCT number, simply press <return> (i.e., leave the ACCT number entry blank) and return to Step 36, Figure 47.

STEP 40: Figure 53 shows the screen which will be displayed when the user has selected to enter/edit the burden rates with the associated ACCT numbers for the first

```
                PROGRAM SEGMENT: LABOR RATES BY COST ACCOUNT
CONTRACT ID: LAMP          FILE NAME: LAMPACT1          CONTRACT LOT: 1

ACCT NUMBER:102   :

          THIS ACCT NUMBER DOES NOT EXIST IN THE DATABASE

          PRESS RETURN TO ENTER THE NEXT ACCT NUMBER
```

FIGURE 52

```
                PROGRAM SEGMENT: PRICING
CONTRACT ID: LAMP                          CONTRACT LOT: 1

          THE FILE LAMPBDN1 IS A NEW FILE

          IS THIS CORRECT? (Y/N) :Y:
```

FIGURE 53

time for a given contract and lot. If the user has selected this option on a file already existing on the disk, the screen shown in Figure 53 will not be displayed, and the user may advance directly to Step 42.

When the user has selected a given contract and lot, this specifies the data file to be edited, this program is set up to check for the existence of the selected data file within the active directory. If the file is not found, Figure 53 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' to allow the program to create the new file, and proceed to Step 42. If the file should already exist within the active directory but was not found, enter an 'N' and proceed to Step 41. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and then user will be asked to enter his/her choice again.

STEP 41: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract identifier or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 3, Figure 3), and then enter another 'R' to return to the operating system and check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 42: When the burden file exists, the program then verifies that ACCT number file, which is cross-referenced during data entry/edit of the burden file, is also available on the disk. If the ACCT number file is found on the disk, the program will proceed to Step 43. If the ACCT number file is not found on the disk, an error message will be displayed to the user (Figure 54) indicating that the ACCT number file was not located, and the user will then be returned to the main menu, Step 3, Figure 3.

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

        THE FILE "LAMPACT1" MUST EXIST ON THE DISK BEFORE BURDEN
        RATES CAN BE ENTERED.

        PLEASE ENTER/COPY THE ACCT FILE ON THE DISK TO CONTINUE

                    ** PRESS RETURN TO CONTINUE **
```

FIGURE 54

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

 BURDEN NOMENCLATURE:

 BURDEN RATE:     0.00%:

 ACCT NUMBER(S):




          '#' - INDICATES AN ENTRY MARKED FOR DELETION
     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:
N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   V - VIEW NEXT ACCT NUMBERS
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU
                  ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 55

STEP 43: Figure 55 shows the screen displayed when the burden file has been found and/or created and the cross-referenced ACCT number file has been found. Note that the center of the second line on the screen displays the name of the data file which will be used in all subsequent burden rate transactions. If the file name displayed is not the data file you wish to be presently working with, select an 'R' from the menu to return to the main menu (Step 3, Figure 3), and then select an 'F' to change the active file.

This screen, Figure 55, as with all of the enter/edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of possible actions to take on the active data file. Within the BDN data file selected, the first record displayed is the first burden nomenclature in alphabetical order in the file. All records in the file are sorted in ascending order by burden nomenclature for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: BURDEN NOMENCLATURE - the actual title associated with a specific burden rate; BURDEN RATE - the actual overhead rate, as a

percentage, which is to be applied to the total dollars proposed, recommended, or negotiated within one or more specific cost accounts; ACCT NUMBER - the alphanumeric sequence used to break down a work effort by cost account for pricing purposes. A sample set of records for this file is shown in Table 6.

TABLE 6
SAMPLE SYSTEM BURDEN DATA

BURDEN NOMENCLATURE	BURDEN RATE AS PERCENT	ACCTS APPLIED TO
Engineering Overhead	120 %	20A
Manufacturing Overhead	75 %	20B,20C
Materiel Overhead	15 %	10A,10B
Profit	20 %	10A,10B,20A 20B,20C

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in burden nomenclature sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in burden nomenclature sequence) in the data file. If a 'P' is selected when you are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'V' to view the next set of ACCT numbers if more ACCT numbers than those readily visible on the screen have been entered to have this burden rate applied to them. The message on the screen stating 'MORE ACCOUNT NUMBERS ON NEXT PAGE' will be displayed when more ACCT numbers are

associated with a specified burden rate. If a 'V' is entered and no more ACCT numbers have been entered into the database, the message 'THERE ARE NO MORE ACCOUNT NUMBERS' will be displayed to the user.

Enter a 'D' to delete the entire record displayed, and proceed to Step 44. Enter an 'A' to add one or more data records to the data file, and proceed to Step 45. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 46. Enter an 'S' to search for a specific WBS number for viewing and/or editing, and proceed to Step 53. Enter an 'R' to return to the main menu and proceed to Step 54. Any entry other than 'N', 'P', 'D', 'V', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 44: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the record from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen (Figure 56). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 43, Figure 54, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 57.) Records marked for deletion are noted on

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

BURDEN NOMENCLATURE: ENGIINEERING OVERHEAD

BURDEN RATE:  120.00%

ACCT NUMBER(S):

  10A


       DO YOU REALLY WISH TO DELETE THIS ENTIRE ENTRY (Y/N) :Y:
```

FIGURE 56

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

BURDEN NOMENCLATURE: ENGIINEERING OVERHEAD

BURDEN RATE:  120.00%

ACCT NUMBER(S):

 #10A


          '#' - INDICATES AN ENTRY MARKED FOR DELETION
     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:
N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   V - VIEW NEXT ACCT NUMBERS
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU
                  ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 57

the screen display by having a '#' symbol placed before the account number(s) which have been deleted. If all of the account numbers are marked for deletion, the entire record is marked for deletion. No records are actually physically deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. Records/ACCT numbers marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting an 'M' from the menu to modify the record.

STEP 45: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 58 is presented. When the user has entered the burden nomenclature, burden rate and the first ACCT number, the program is written to allow the user to 'add' any number of additional ACCT numbers to which the burden rate should also be applied before it proceeds on to accept input for the next burden nomenclature. (See Figure 59.) When the user has entered all of the desired ACCT numbers for a specific burden rate, press <return> (i.e., enter of a blank ACCT number) to terminate the entry of ACCT numbers, and the user will return to the entry of burden nomenclatures. The program is written to stay in the 'add' mode until all of the burden nomenclatures, rates, and

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

BURDEN NOMENCLATURE:_                                  :

BURDEN RATE:     0.00%:

ACCT NUMBER(S):      :




        ENTER THE DESIRED BURDEN RATE, NOMENCLATURE AND APPLICABLE
                              ACCOUNT NUMBERS

      LEAVE THE ENTRIES BLANK AND PRESS <RETURN>'S TO EXIT ADD MODE
```

FIGURE 58

```
                    PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP          FILE NAME: LAMPBDN1          CONTRACT LOT: 1

BURDEN NOMENCLATURE:MANUFACTURING OVERHEAD        :

BURDEN RATE:    75.00%:

ACCT NUMBER(S):_     :

       20B     20C


        ENTER THE DESIRED BURDEN RATE, NOMENCLATURE AND APPLICABLE
                              ACCOUNT NUMBERS

      LEAVE THE ENTRIES BLANK AND PRESS <RETURN>'S TO EXIT ADD MODE
```

FIGURE 59

associated ACCT numbers that the user desires to add have been entered.

The program has also been written to verify that all of the ACCT numbers entered in this burden rate file already exist in the corresponding ACCT file. If an ACCT number is entered in response to Figure 58 or 59 that does not already exist in the ACCT file, an error message will be displayed to the user (Figure 60), requesting that he/she correct the entry. When the user has entered all of the desired burden nomenclatures, burden rates, and their associated ACCT numbers, simply press <return>'s through each of the data fields (i.e., leave the field entries blank), and the program will return the user to Step 43, Figure 55.

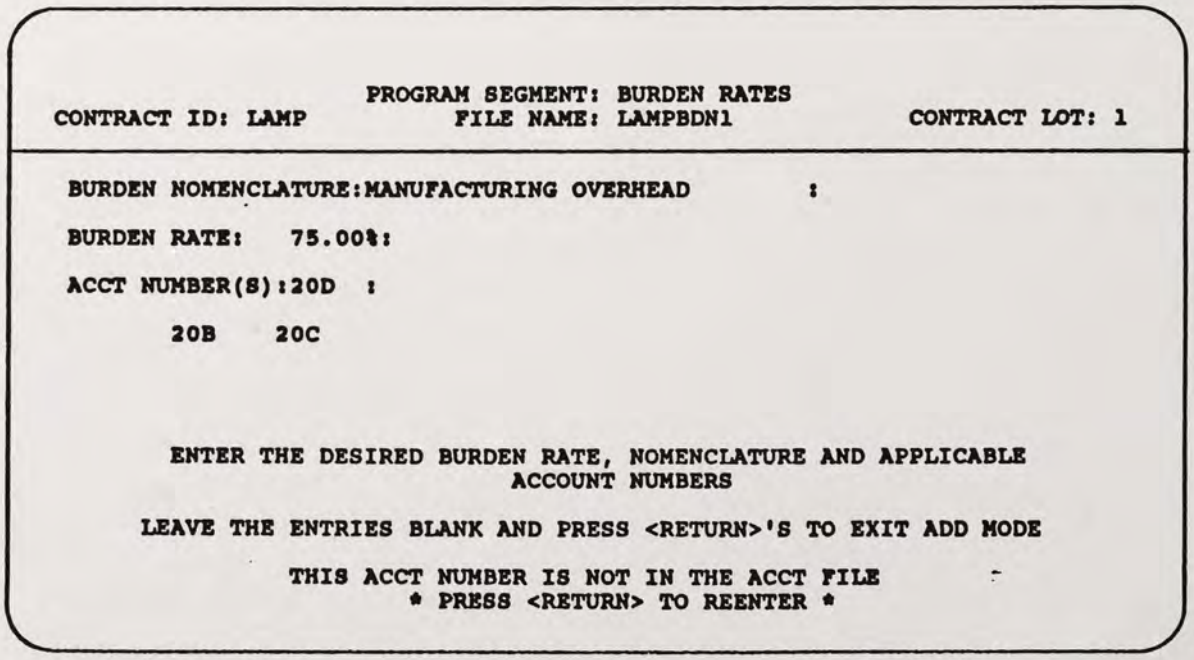


FIGURE 60

STEP 46: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen shown in Figure 61 to be displayed. At this point, the bottom third of the screen shows a menu of the data fields that can be modified via the modify routine. Having determined which field you wish to modify (or if you wish to modify more than one field, select one field at a time), enter an 'N' to modify the BURDEN NOMENCLATURE and proceed to Step 47, a 'B' to modify the BURDEN RATE and proceed to Step 48, an 'A' to modify the ACCT NUMBER(S) and proceed to Step 49, or an 'R' to return to the previous menu and return to Step 43, Figure 55. Any entry other than an 'N', 'B', 'A', or 'R' will result in an error message being displayed, and the user will be asked to correct and reenter his/her selection.

STEP 47: Figure 62 is the screen which will be displayed when the user has selected option 'N' to modify the BURDEN NOMENCLATURE. At this point the user may make the desired modifications to the nomenclature, and when complete, enter a <return> to save the modified entry. It should be noted that no duplicate entries in the BURDEN NOMENCLATURE field will be permitted in the database, so if the user modifies the nomenclature to a entry already existing in the database, an error message will be displayed to the user, and the user will be requested to correct and reenter the modification.

```
                        PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP             FILE NAME: LAMPBDN1              CONTRACT LOT: 1

BURDEN NOMENCLATURE: ENGINEERING OVERHEAD

BURDEN RATE:  120.00%

ACCT NUMBER(S):

  10A     20A



          '#' - INDICATES AN ENTRY MARKED FOR DELETION

               WHICH ENTRY DO YOU WISH TO MODIFY:
N - BURDEN NOMENCLATURE                    B - BURDEN RATE
A - ACCT NUMBER(S)                         R - RETURN TO PREVIOUS MENU

                                   ENTER CHOICE:_:
```

FIGURE 61

```
                        PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP             FILE NAME: LAMPBDN1              CONTRACT LOT: 1

BURDEN NOMENCLATURE:ENGINEERING OVERHEAD          :

BURDEN RATE:  120.00%

ACCT NUMBER(S):

  10A     20A



          ENTER THE CHANGE TO THE BURDEN NOMENCLATURE
```

FIGURE 62

STEP 48: Figure 63 is the screen which will be displayed when the user has selected option 'B' to modify the BURDEN RATE. At this point the user may make the desired modifications to the burden rate, and when complete, enter a <return> to save the modified entry.

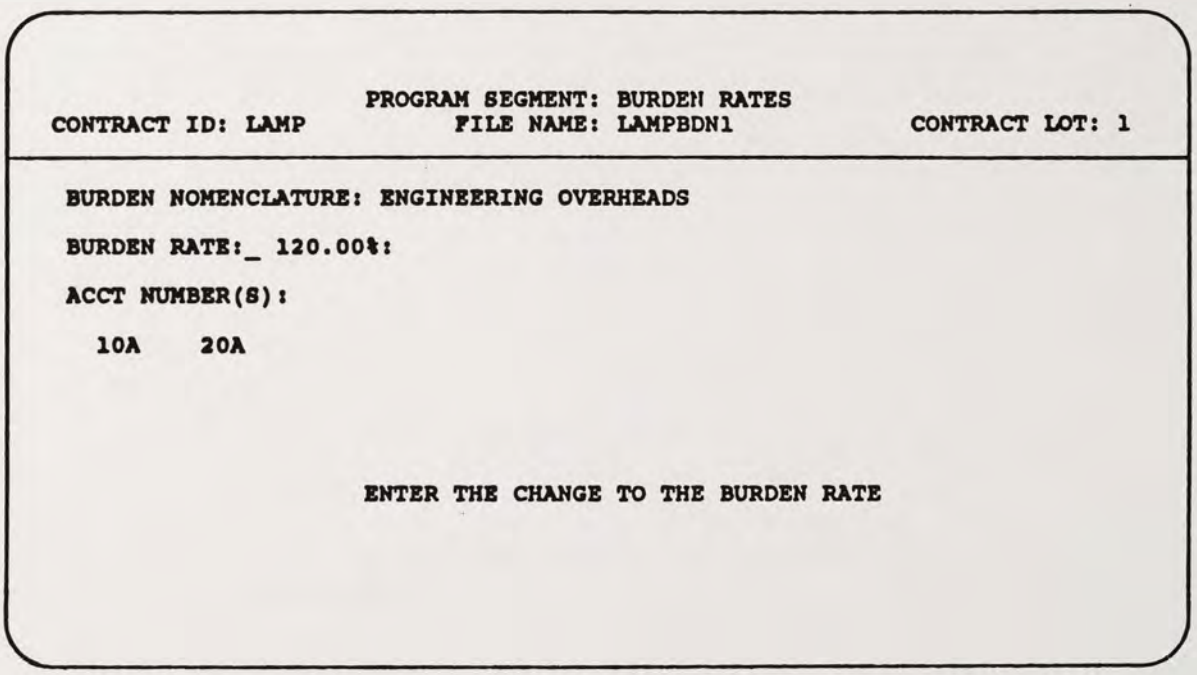


FIGURE 63

STEP 49: Figure 64 is the screen that will be displayed when the user has selected the option 'A' to modify the ACCT NUMBER(S) associated with a specific burden rate. At this time a third menu is displayed to the user allowing him/her to select the specific action that he/she wishes to take on the ACCT numbers associated with the BURDEN NOMENCLATURE and BURDEN RATE displayed. Enter an 'A' to add an ACCT number to this record and proceed to

```
                        PROGRAM SEGMENT: BURDEN RATES
CONTRACT ID: LAMP              FILE NAME: LAMPBDN1              CONTRACT LOT: 1

BURDEN NOMENCLATURE: ENGINEERING OVERHEADS

BURDEN RATE:  125.00%

ACCT NUMBER(S):

  10A    20A



          '#' - INDICATES AN ENTRY MARKED FOR DELETION

     WHICH ACTION DO YOU WISH TO TAKE WITH THE ACCOUNT NUMBERS:
A - ADD AN ACCOUNT                              D - DELETE AN ACCOUNT
M - MODIFY AN ACCOUNT                           U - UNDELETE AN ACCOUNT
                                                R - RETURN TO PREVIOUS MENU
                                 ENTER CHOICE:_:
```

FIGURE 64

Step 50, an 'M' to modify a specific ACCT number and proceed to Step 51, a 'D' to delete one of the ACCT numbers displayed and proceed to Step 52, a 'U' to undelete an ACCT number marked for deletion and proceed to Step 52, or an 'R' to return to the previous menu and return to Step 46, Figure 61. Any entry other than an 'A', 'M', 'D', 'U', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 50: When the user selects an 'A' to add one or more ACCT numbers to the record displayed, the screen shown in Figure 65 is presented. At this time the user may enter the additional ACCT number that the burden rate displayed

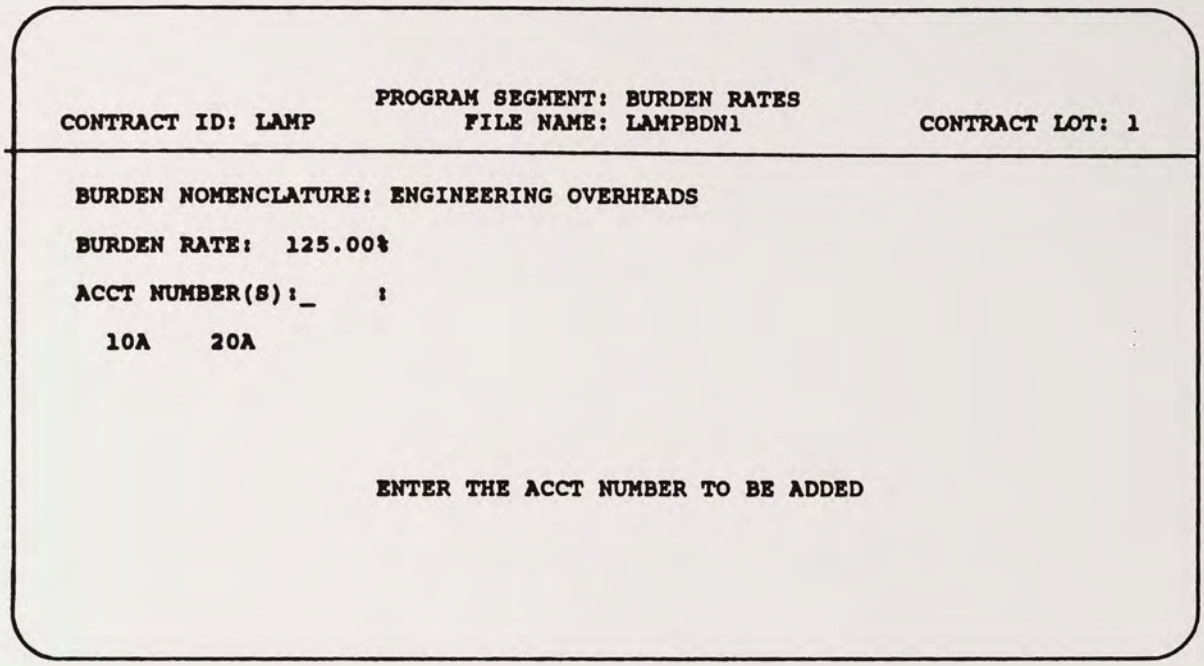


FIGURE 65

is to be applied to. If multiple ACCT numbers are to be added, the 'ADD AN ACCOUNT' selection should be repeatedly made.

The program has been written to verify that all of the ACCT numbers entered in this burden rate file already exist in the corresponding ACCT file. If an ACCT number is entered in response to Figure 65 that does not already exist in the ACCT file, an error message will be displayed to the user (Figure 66), indicating that the ACCT number in not in the ACCT database file, and then return the user to Step 49, Figure 64.

STEP 51: If the user wishes to change an ACCT number displayed to another ACCT number, he/she may elect to

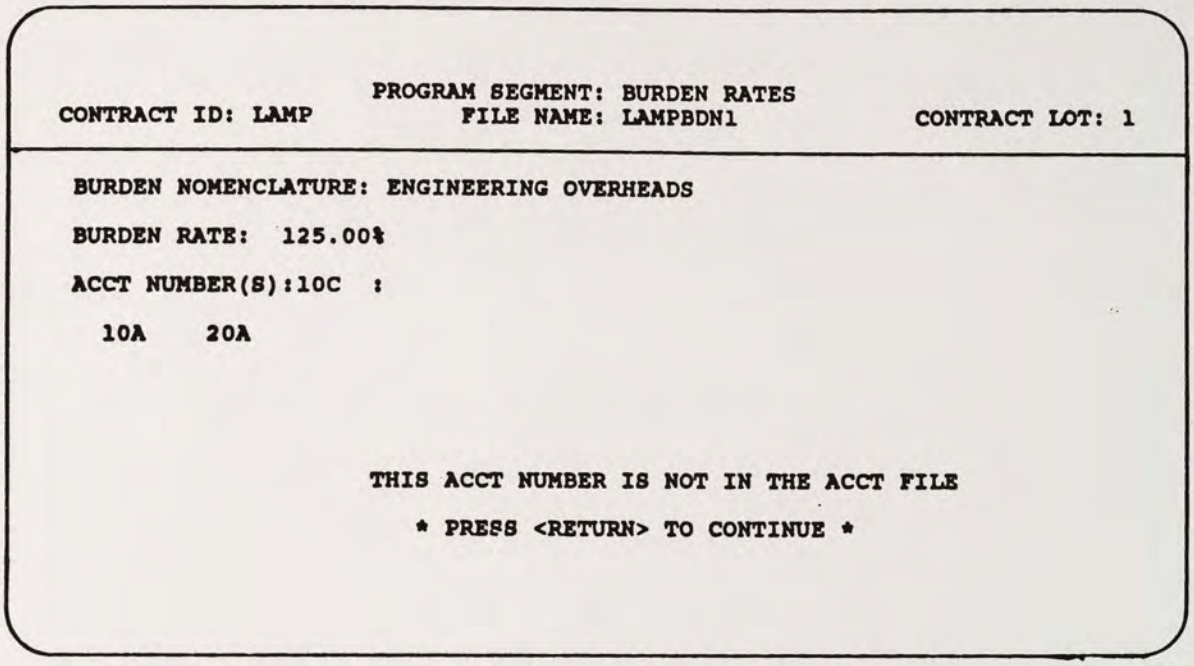


FIGURE 66

'MODIFY AN ACCOUNT', which will result in the screen displayed in Figure 67. At this time the user is asked to enter the ACCT number that he/she wishes to modify (i.e., the ACCT number presently in the database). Once the user has entered that number and entered a <return>, the screen shown in Figure 68 will be displayed, requesting the user to enter the change that should be made to that ACCT number. If the ACCT number that the user wishes to modify is not located in the record displayed, an error message will be displayed, and the user will be returned to Step 49, Figure 64.

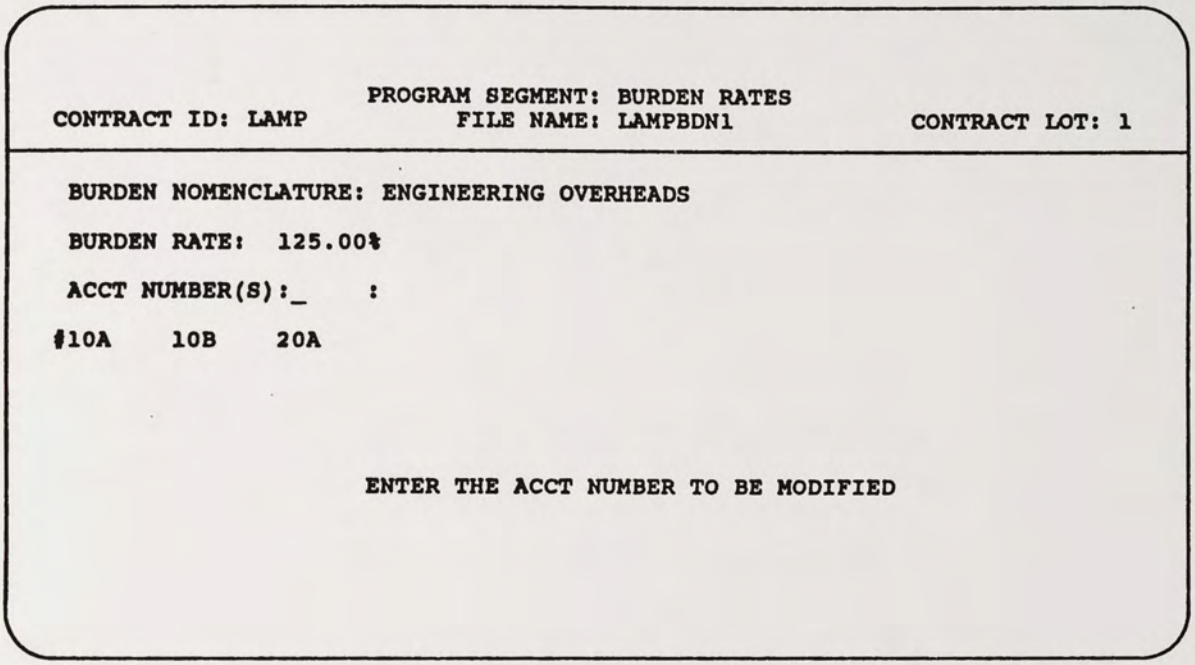


FIGURE 67

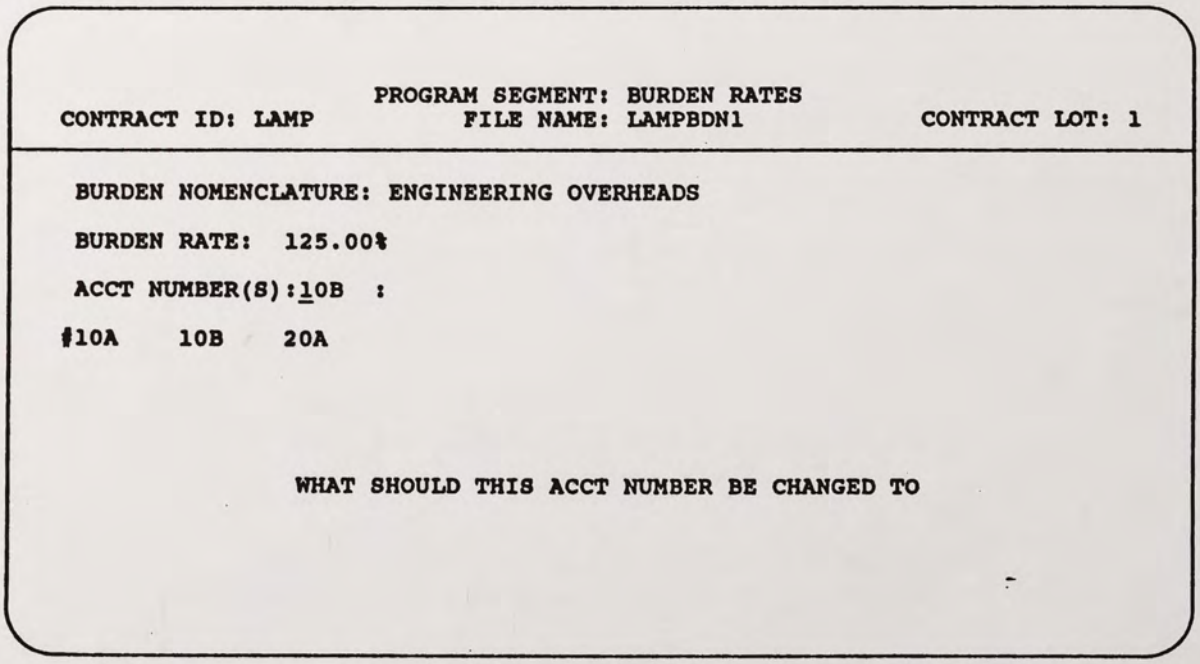


FIGURE 68

STEP 52: If an ACCT number is found in the data record that should not be there, selection of a 'D' will allow the user to delete the ACCT number from the database record. When the user selects a 'D', the program will ask the user to enter the ACCT number that he/she wishes to delete (Figure 69). If the ACCT number entered by the user is located within the database record displayed, that ACCT number will be marked for deletion. If the ACCT number entered is not found, an error message will be displayed to the user, and the user will be returned to Step 49, Figure 64.

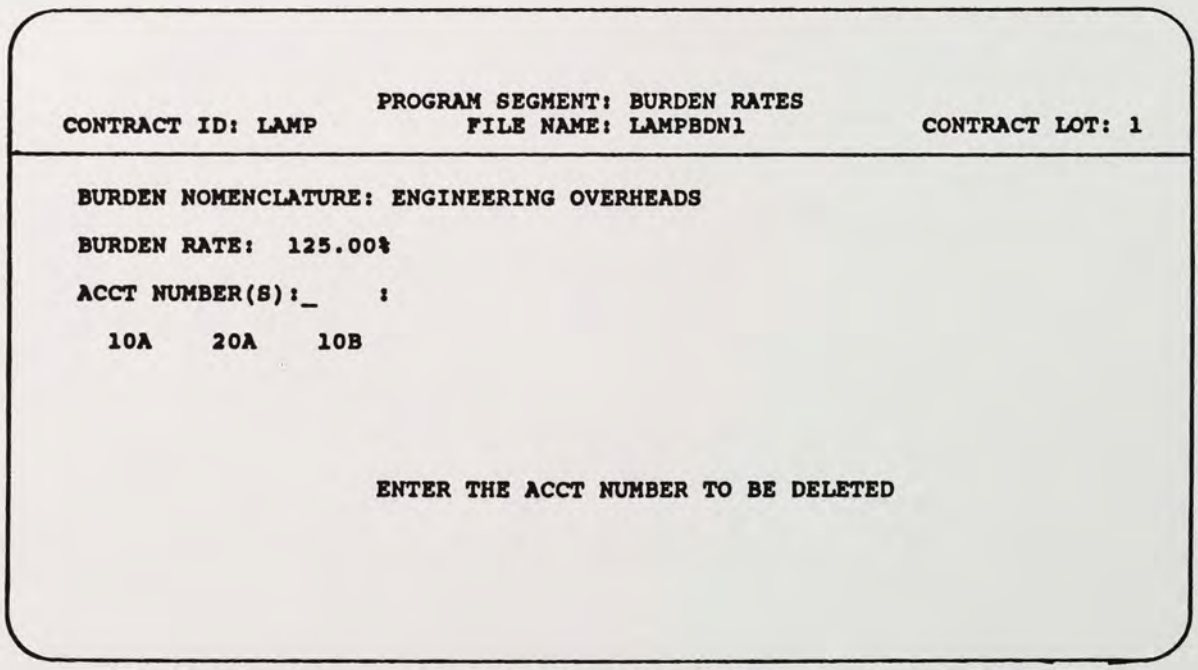


FIGURE 69

ACCT numbers marked for deletion are noted on the screen display by having a '#' symbol placed before the account number(s) which have been deleted. If all of the account

numbers are marked for deletion, the record itself is marked for deletion. No ACCT numbers are actually physically deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. ACCT numbers marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific ACCT number can be removed by selecting a 'U' from the menu to undelete an ACCT number. (See Figure 70.)

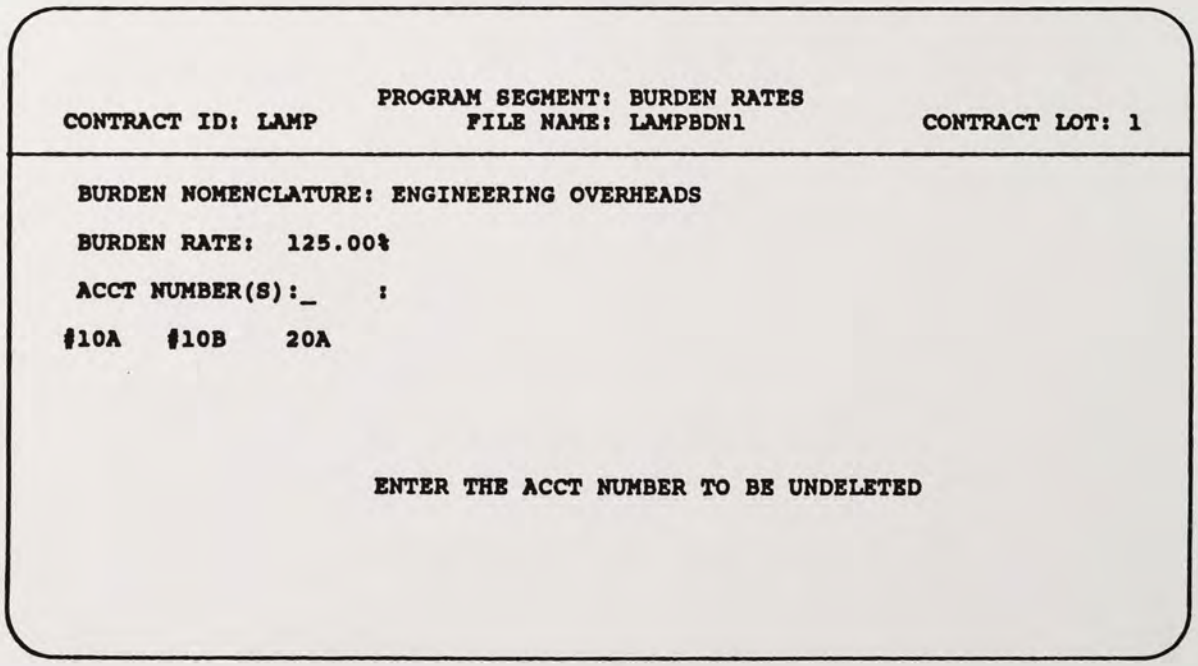


FIGURE 70

STEP 53: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for

modification. When the user enters an 'S', the screen shown in Figure 71 is displayed. This requests the user to enter the BURDEN NOMENCLATURE that he/she wishes to locate within the data file. If the desired nomenclature is located, that entire record is displayed on the screen, and the user is returned to Step 43, Figure 55, to allow him/her to review, modify, or delete the selected record. If the desired nomenclature is not located within the data file, an error message is displayed to the user, and the user is asked to enter another BURDEN NOMENCLATURE. (See Figure 72.) If the user at this time does not wish to search for another record, simply press <return> (i.e., leave the BURDEN NOMENCLATURE entry blank) and return to Step 43, Figure 55.

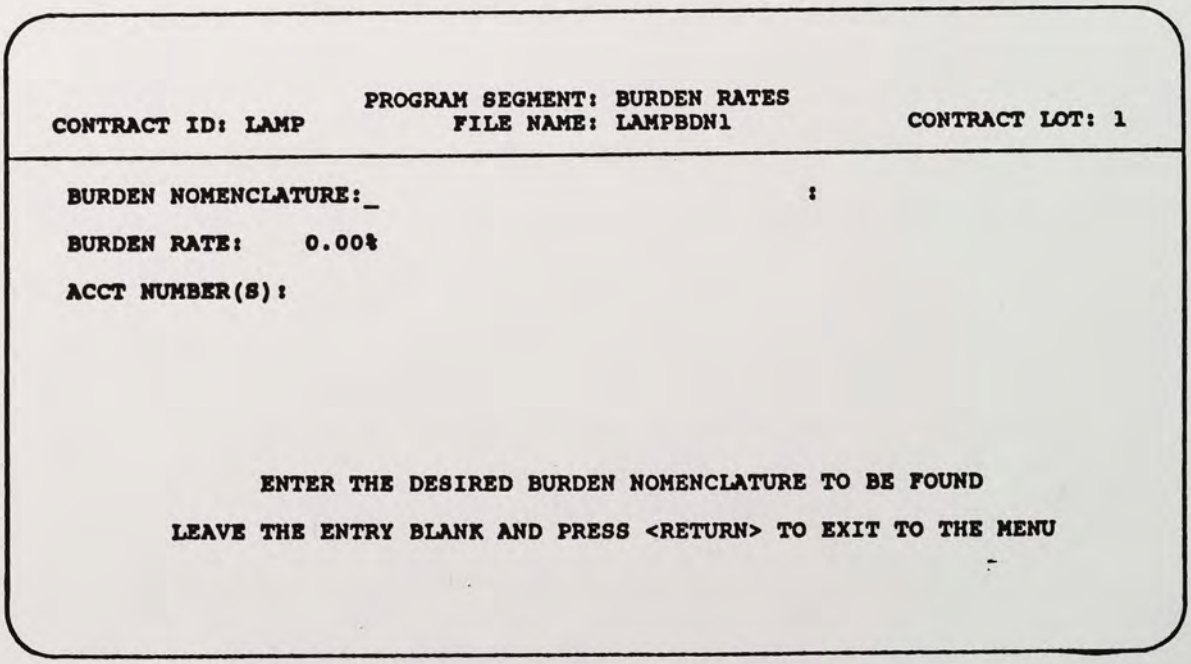


FIGURE 71

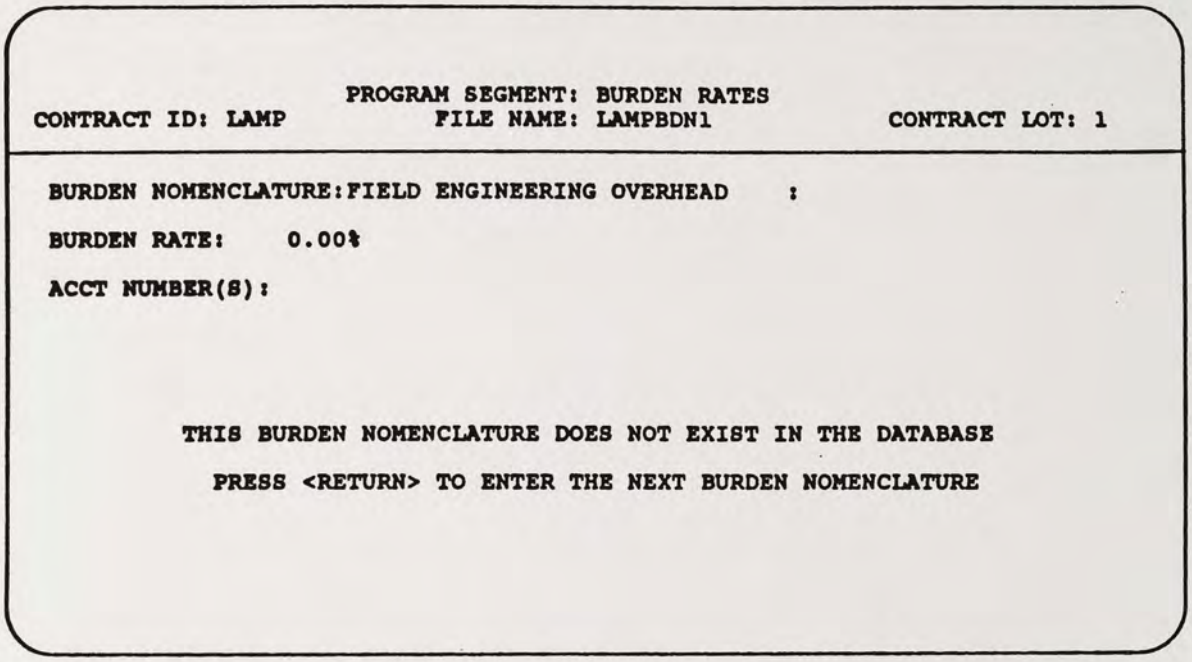


FIGURE 72

STEP 54: If the user has selected an 'R' to return to the main menu, to program will proceed to one of two possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program's main menu, Step 3, Figure 3. However, if any records were marked for deletion during the burden rate enter/edit routine, the screen shown in Figure 73 will be displayed, asking the user if he/she wants to permanently delete the records that have marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the records marked for deletion from the data file and reindex the data file. A reply of 'N' (no) to this prompt

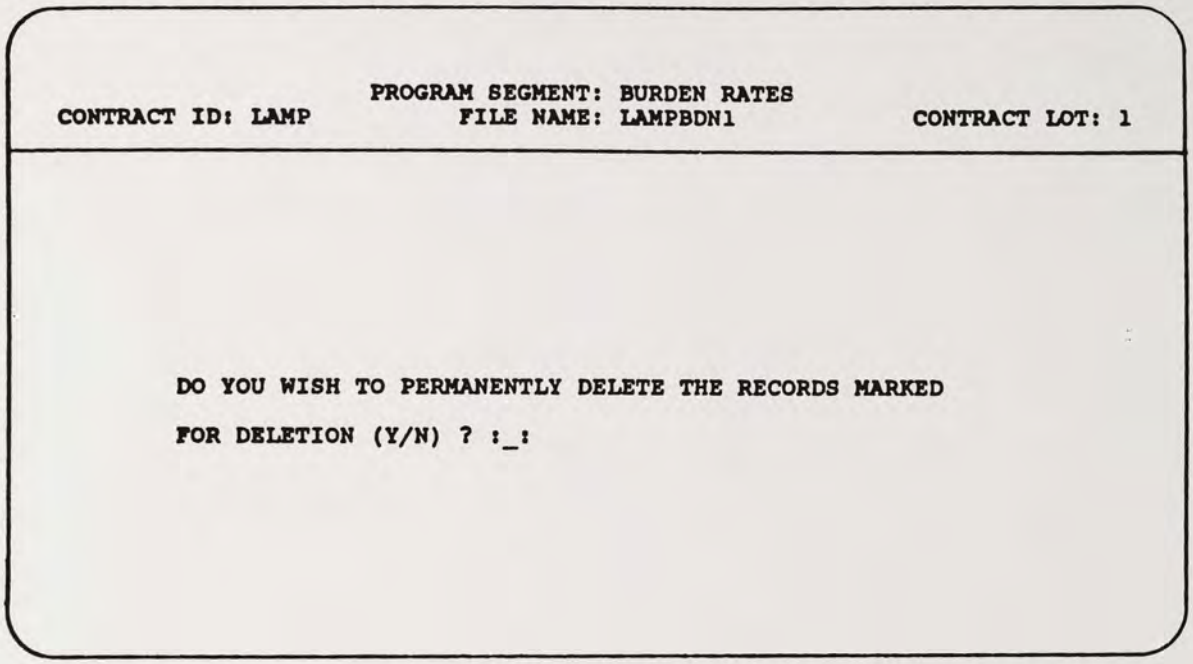


FIGURE 73

will leave all records in the file, including those marked for deletion. Records marked for deletion will not be included in any reports generated by this program. Any entry other than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry.

STEP 55: Figure 74 shows the screen which will be displayed when the user has selected to enter/edit the hours/dollars by WBS, ACCT, and DEPT for the first time for a given contract and lot. If the user has selected this option on a file already existing on the disk, the screen shown in Figure 74 will not be displayed, and the user may advance directly to Step 57.

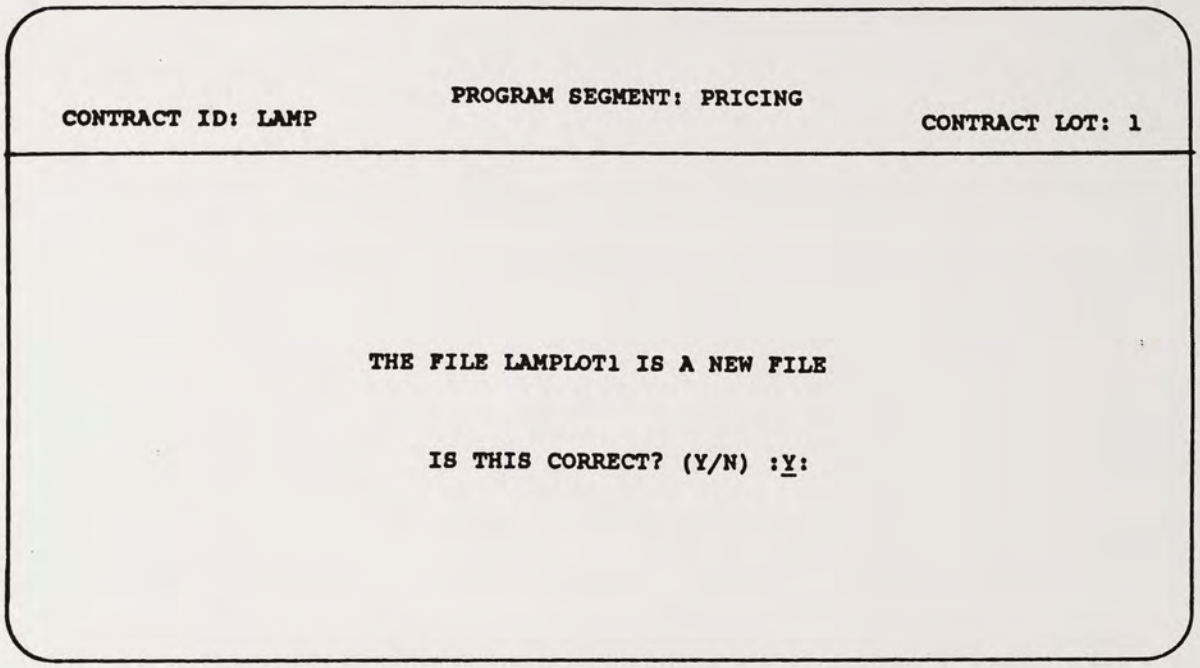


FIGURE 74

When the user has selected a given contract and lot, this specifies the data file to be edited, and this program is set up to check for the existence of the selected data file within the active directory. If the file is not found, Figure 74 is displayed to the user to verify that the data file should indeed be a new file. If the file is indeed a new file, enter a 'Y' to allow the program to create the new file, and proceed to Step 57. If the file should already exist within the active directory but was not found, enter an 'N' and proceed to Step 56. If any character other than an 'N' or 'Y' is entered at the prompt, an error message will be displayed, and the user will be asked to enter his/her choice again.

STEP 56: If the data file was not located on the disk within the active directory, a message will be displayed to the user, as shown in Figure 5. If the user feels that the data file should already exist within the directory and the program did not locate it, any one of several problems may exist. First, the user may have misspelled the contract identifier or entered the incorrect contract lot number. If either of these is the problem, enter a 'C' to change the contract id and/or lot number, and return to Step 2.

Another possible problem preventing the program from locating the data file is the actual location of the data file on the disk. All files required to operate this program (including the contract and lot data files) must be located within the same subdirectory as this program. Any files located in a different subdirectory will not be identified, and will thus produce the message shown in Figure 5. Also, if the data files were never relocated to the active directory from another machine or disk, this message will appear. To check for either of these errors, enter an 'R' to return to the main menu (Step 3, Figure 3), and then enter another 'R' to return to the operating system and check the appropriate directory. If a character other than 'R' or 'C' is entered in response to the prompt in Figure 5, an error message will be displayed, and the user will be asked to correct and reenter his selection.

STEP 57: Figure 75 or 76 shows the screen displayed when the lot file has been correctly found and/or created. When the lot file exists, the program then verifies that all of the other files which are cross-referenced during data entry/edit of the lot file are also available on the disk. This includes the DEPT file, the ACCT file, and the WBS file. If all of these files are found on the disk, as shown in Figure 75, the program will proceed to Step 58. If any one of the cross-referenced files is not found on the disk, one or more error messages will be displayed to the user (Figure 76) listing the data files which were not located, and the user will then be returned to the main menu, Step 3, Figure 3.

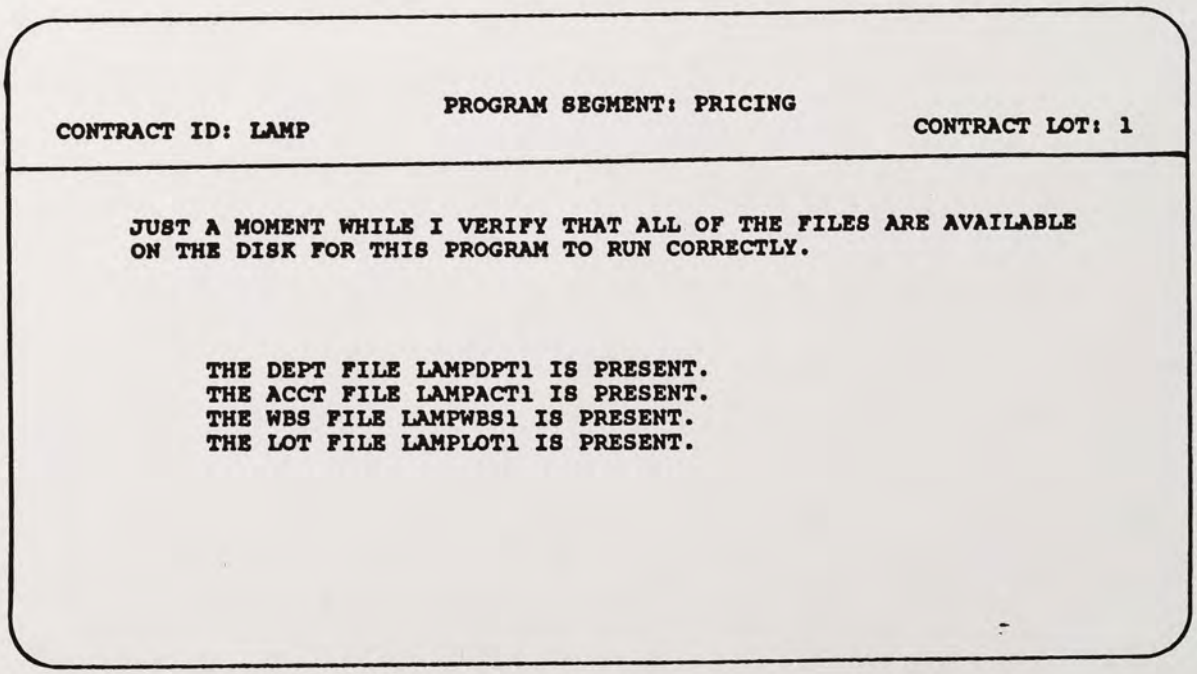


FIGURE 75

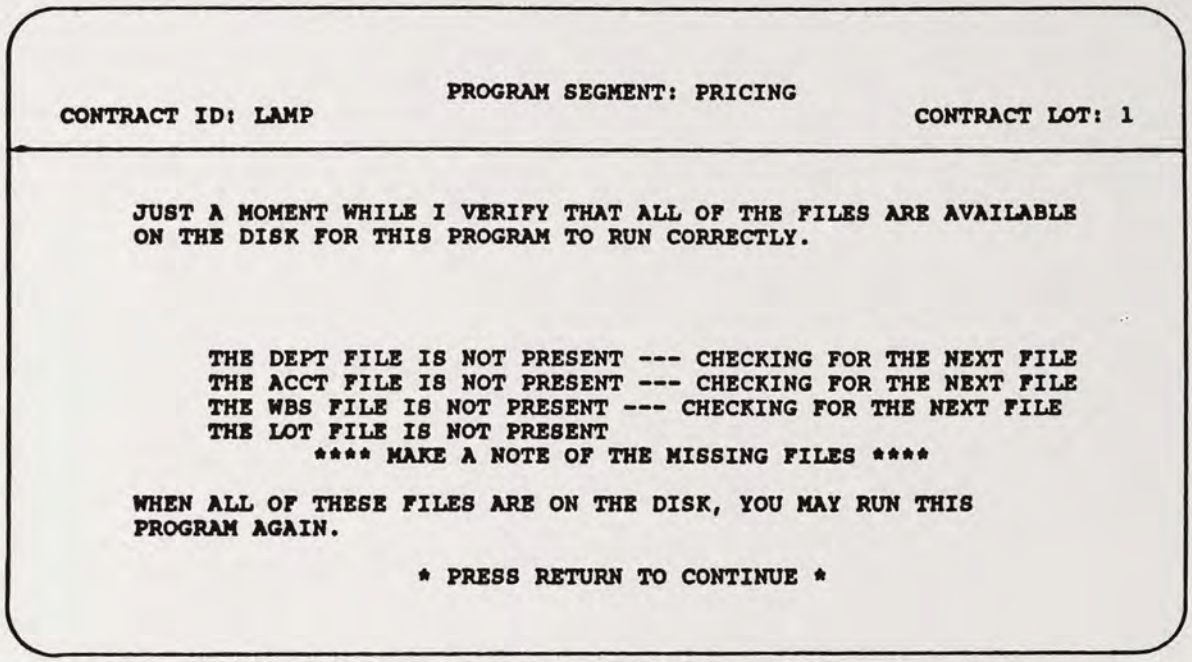


FIGURE 76

STEP 58: Figure 77 shows the screen displayed when all of the files have been correctly found and/or created. At this time the user must select the type of hour/dollar data that he/she wishes to enter. Though all three of the positions will be displayed on the screen for the user to view, the user will only have access to the type of data that he/she selects in response to this prompt for data entry/edit. Select a 'P' to enter/edit the proposed hours/dollars by WBS number, ACCT number, and DEPT. Select an 'R' to enter/edit the recommended hours/dollars by WBS number, ACCT number, and DEPT. Select an 'N' to enter/edit the negotiated hours/dollars by WBS number, ACCT number,

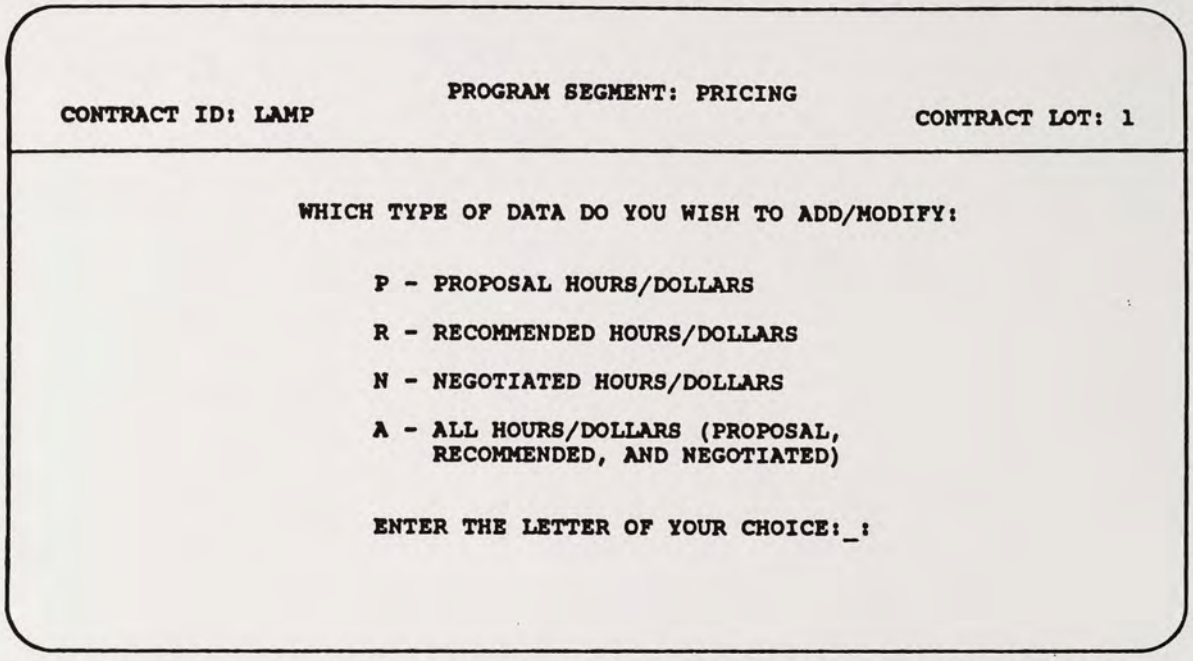


FIGURE 77

and DEPT. Select an 'A' to edit/enter the proposed, recommended and negotiated hours/dollars by WBS number, ACCT number, and DEPT. After any of these entries, proceed to Step 59. Any entry other than 'P', 'R', 'N', or 'A' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 59: Figure 78 shows the screen displayed when the lot file has been found and/or created, all of the cross-referenced files have been found, and the user has selected the type of data that he/she wishes to enter/edit. Note that the center of the second line on the screen displays the name of the data file which will be used in all

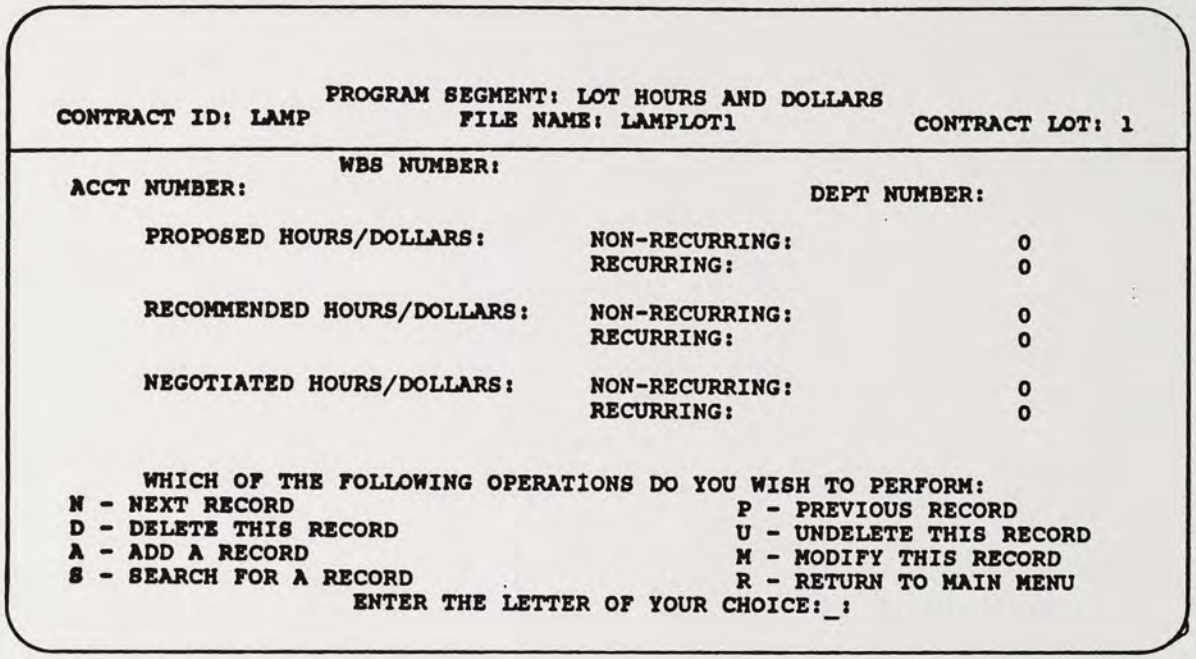


FIGURE 78

subsequent hour/dollar transactions. If the file name displayed is not the data file you wish to be presently working with, select an 'R' from the menu to return to the main menu (Step 3, Figure 3), and then select an 'F' to change the active file.

This screen, Figure 78, as well as all of the enter/edit data screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, contract lot number, file name), the center section displaying a specific entry within the data file (or a blank entry if no data has yet been entered into the data file), and the bottom section displaying a menu of

possible actions to take on the active data file. Within the LOT data file selected, the first record displayed is the lowest WBS number, ACCT number and DEPT in the file. All records in the file are sorted in ascending order by WBS number, then ACCT number, and then DEPT for display purposes.

Within the center section of the screen, the data fields displayed are described as follows: WBS NUMBER - the alphanumeric sequence used to break down a specific contractual effort by component/task for pricing purposes.; ACCT NUMBER - the alphanumeric sequence used to break down a work effort by cost account for pricing purposes.; DEPT - the alphanumeric sequence used to identify the various departments within a corporation where specific sections of the contractual work effort will be performed.; PROPOSED HOURS/DOLLARS, NON-RECURRING - the number of hours or dollars (depending on the ACCT number) proposed which are non-recurring within the specified WBS number and DEPT.; PROPOSED HOURS/DOLLARS, RECURRING - the number of hours or dollars (depending on the ACCT number) proposed which are recurring within the specified WBS number and DEPT.; RECOMMENDED HOURS/DOLLARS, NON-RECURRING - the number of hours or dollars (depending on the ACCT number) recommended which are non-recurring within the specified WBS number and DEPT.; RECOMMENDED HOURS/DOLLARS, RECURRING - the number of hours or dollars (depending on

the ACCT number) recommended which are recurring within the specified WBS number and DEPT.; NEGOTIATED HOURS/DOLLARS, NON-RECURRING - the number of hours or dollars (depending on the ACCT number) negotiated which are non-recurring within the specified WBS number and DEPT.; NEGOTIATED HOURS/DOLLARS, RECURRING - the number of hours or dollars (depending on the ACCT number) negotiated which are recurring within the specified WBS number and DEPT. A sample record for this file is shown in Table 7.

TABLE 7
SAMPLE SYSTEM HOURS/DOLLARS DATA

WBS NUMBER : 01.01
ACCT NUMBER: 10A DEPT: 502

Proposed	Non-Recurring:	100
	Recurring:	10
Recommended	Non-Recurring:	70
	Recurring:	10
Negotiated	Non-Recurring:	75
	Recurring:	10

Using the menu at the bottom of the screen, enter the action of your choice. Select an 'N' to display the next record (in WBS number, ACCT number, and DEPT sequence) in the data file. If an 'N' is selected when you are at the end of the file, the message "THIS IS THE LAST RECORD" will be displayed on the screen. Select a 'P' to display the previous record (in WBS number, ACCT number, and DEPT sequence) in the data file. If a 'P' is selected when you

are at the beginning of the file, the message "THIS IS THE FIRST RECORD" will be displayed.

Enter a 'D' to delete the record displayed, and proceed to Step 60. Enter a 'U' to undelete a record which was previously marked for deletion. (See Step 60.) Enter an 'A' to add one or more data records to the data file, and proceed to Step 61. Enter an 'M' to modify the record presently displayed on the screen, and proceed to Step 62. Enter an 'S' to search for a specific WBS number for viewing and/or editing, and proceed to Step 63. Enter an 'R' to return to the main menu (Figure 3), and proceed to Step 64. Any entry other than 'N', 'P', 'D', 'U', 'A', 'M', 'S', or 'R' will cause an error message to be displayed on the screen, and will prompt the user to provide another entry.

STEP 60: If a record is found in the data file that should not be there, selection of a 'D' will allow the user to delete the record from the data file. When the user selects a 'D', the program will ask the user if he/she really wishes to delete the entry shown on the screen (Figure 79). If the user enters an 'N' (no) in response to this query, the program will return the user to Step 59, Figure 78, with no action taken on the data file record. If the user enters a 'Y' (yes) in response to this query, the program will mark the record displayed for deletion. (See Figure 80.) No records are actually physically

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1
                    WBS NUMBER: 01.01
ACCT NUMBER: 10A                                  DEPT NUMBER: 502

     PROPOSED HOURS/DOLLARS:        NON-RECURRING:          100
                                    RECURRING:               10

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING:           0
                                    RECURRING:               0

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING:           0
                                    RECURRING:               0


          DO YOU REALLY WISH TO DELETE THIS ENTRY? (Y/N) :Y:
```

FIGURE 79

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1
                    WBS NUMBER: 01.01
ACCT NUMBER: 10A                                  DEPT NUMBER: 502

     PROPOSED HOURS/DOLLARS:        NON-RECURRING:          100
                                    RECURRING:               10

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING:           0
                                    RECURRING:               0

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING:           0
                                    RECURRING:               0
                  ** RECORD MARKED FOR DELETION **

     WHICH OF THE FOLLOWING OPERATIONS DO YOU WISH TO PERFORM:
N - NEXT RECORD                          P - PREVIOUS RECORD
D - DELETE THIS RECORD                   U - UNDELETE THIS RECORD
A - ADD A RECORD                         M - MODIFY THIS RECORD
S - SEARCH FOR A RECORD                  R - RETURN TO MAIN MENU
                ENTER THE LETTER OF YOUR CHOICE:_:
```

FIGURE 80

deleted from the data file until the user returns to the main menu; they are simply marked to be deleted at this time. Records marked for deletion but not permanently deleted will not be included in any reports generated by this program. The mark for deletion of a specific record can be removed by selecting a 'U' from the menu to undelete the record.

STEP 61: When the user selects an 'A' to add one or more records to the data file, the screen displayed in Figure 81, 82, 83, or 84 is presented, depending upon whether the user previously selected to work with proposed, recommended, negotiated, or all data, respectively. The program is written to stay in the 'add' mode until all of the hours/dollars data that the user desires to add have been entered. The program has been written to verify that all of the WBS numbers, ACCT numbers, and DEPTs entered in this hours/dollars file already exist in their corresponding WBS, ACCT, or DEPT file. If a WBS number is entered in response to Figure 81, 82, 83, or 84 that does not already exist in the WBS file, an error message will be displayed to the user (Figure 85), requesting that he/she corrects the entry. Also, if an ACCT number is entered in response to Figure 81, 82, 83, or 84 that does not already exist in the ACCT file, an error message will be displayed to the user (Figure 86), requesting that he/she corrects the entry. And finally, if a DEPT is entered in response

```
                PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                WBS NUMBER:_                                  :
ACCT NUMBER:      :                                DEPT NUMBER:      :

     PROPOSED HOURS/DOLLARS:       NON-RECURRING::              0:
                                   RECURRING:    :              0:

     RECOMMENDED HOURS/DOLLARS:    NON-RECURRING:               0
                                   RECURRING:                   0

     NEGOTIATED HOURS/DOLLARS:     NON-RECURRING:               0
                                   RECURRING:                   0


        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

    LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 81

```
                PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                WBS NUMBER:_                                  :
ACCT NUMBER:      :                                DEPT NUMBER:      :

     PROPOSED HOURS/DOLLARS:       NON-RECURRING:               0
                                   RECURRING:                   0

     RECOMMENDED HOURS/DOLLARS:    NON-RECURRING::              0:
                                   RECURRING:    :              0:

     NEGOTIATED HOURS/DOLLARS:     NON-RECURRING:               0
                                   RECURRING:                   0


        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

    LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 82

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                    WBS NUMBER:_                              :
ACCT NUMBER:      :                                DEPT NUMBER:      :

     PROPOSED HOURS/DOLLARS:        NON-RECURRING:              0
                                    RECURRING:                  0

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING:              0
                                    RECURRING:                  0

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING::             0:
                                    RECURRING:    :             0:


        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

     LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 83

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                    WBS NUMBER:_                              :
ACCT NUMBER:      :                                DEPT NUMBER:      :

     PROPOSED HOURS/DOLLARS:        NON-RECURRING::             0:
                                    RECURRING:    :             0:

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING::             0:
                                    RECURRING:    :             0:

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING::             0:
                                    RECURRING:    :             0:


        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

     LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 84

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                  WBS NUMBER:03                          :
ACCT NUMBER:10A  :                          DEPT NUMBER:502  :

     PROPOSED HOURS/DOLLARS:       NON-RECURRING::          20:
                                   RECURRING:    :           0:

     RECOMMENDED HOURS/DOLLARS:    NON-RECURRING:           0
                                   RECURRING:               0

     NEGOTIATED HOURS/DOLLARS:     NON-RECURRING:           0
                                   RECURRING:               0

          * WBS NUMBER "03" IS NOT IN THE WBS DATABASE *
                    * PLEASE CORRECT AND REENTER *

        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

    LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 85

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                  WBS NUMBER:02.01                       :
ACCT NUMBER:30A  :                          DEPT NUMBER:502  :

     PROPOSED HOURS/DOLLARS:       NON-RECURRING::          20:
                                   RECURRING:    :           0:

     RECOMMENDED HOURS/DOLLARS:    NON-RECURRING:           0
                                   RECURRING:               0

     NEGOTIATED HOURS/DOLLARS:     NON-RECURRING:           0
                                   RECURRING:               0

       * ACCOUNT NUMBER "30A  " IS NOT IN THE ACT DATABASE *
                    * PLEASE CORRECT AND REENTER *

        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

    LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 86

to Figure 81, 82, 83, or 84 that does not already exist in the DEPT file, an error message will be displayed to the user (Figure 87), requesting that he/she corrects the entry. When the user has entered all of the desired WBS numbers and their associated nomenclature, simply press <return>'s through each of the data fields (i.e., leave the field entries blank), and the program will return the user to Step 59, Figure 78.

```
                PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                WBS NUMBER:02.01                    :
ACCT NUMBER:10A  :                    DEPT NUMBER:600  :

     PROPOSED HOURS/DOLLARS:      NON-RECURRING::          20:
                                  RECURRING:    :           0:

     RECOMMENDED HOURS/DOLLARS:   NON-RECURRING:           0
                                  RECURRING:               0

     NEGOTIATED HOURS/DOLLARS:    NON-RECURRING:           0
                                  RECURRING:               0

        * DEPARTMENT NUMBER "600  " IS NOT IN THE DPT DATABASE *
                  * PLEASE CORRECT AND REENTER *

        ENTER THE DESIRED HOURS/DOLLARS BY WBS, ACCT, AND DEPT.

     LEAVE THE ENTRIES BLANK AND PRESS RETURN(S) TO EXIT TO THE MENU
```

FIGURE 87

STEP 62: Entering an 'M' in response to the menu to modify the record displayed on the screen will cause the screen to display Figure 88, 89, 90, or 91, depending upon whether the user previously selected to work with proposed, recommended, negotiated, or all data, respectively. For the proposed data (Figure 88), the WBS number, ACCT number,

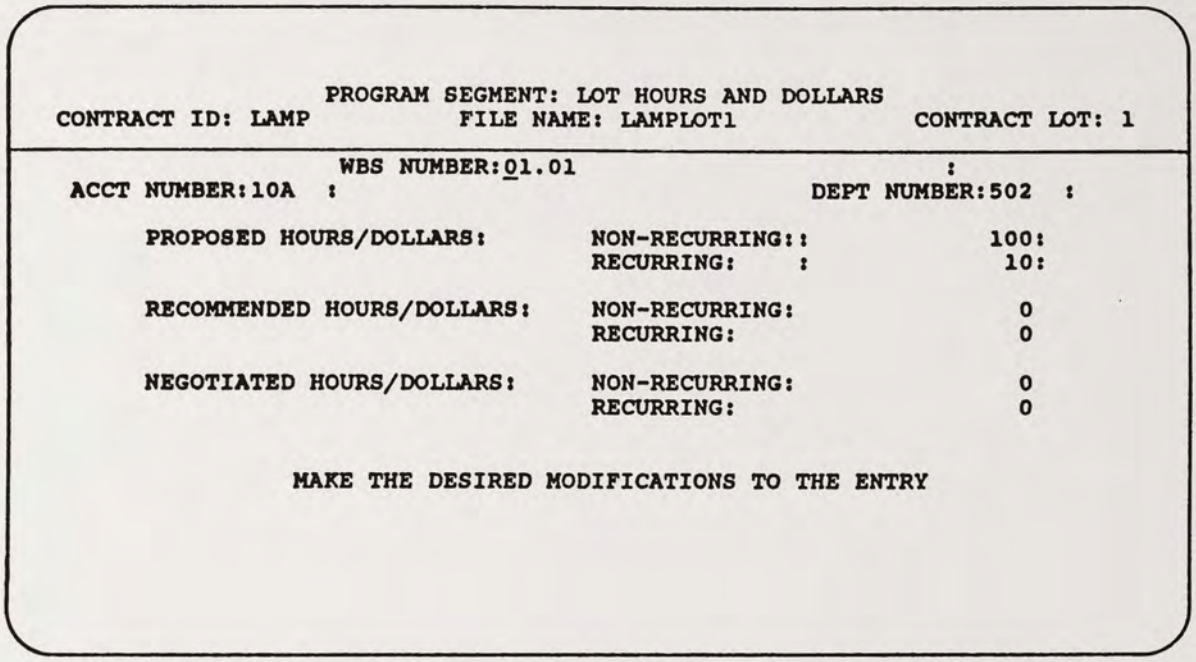


FIGURE 88

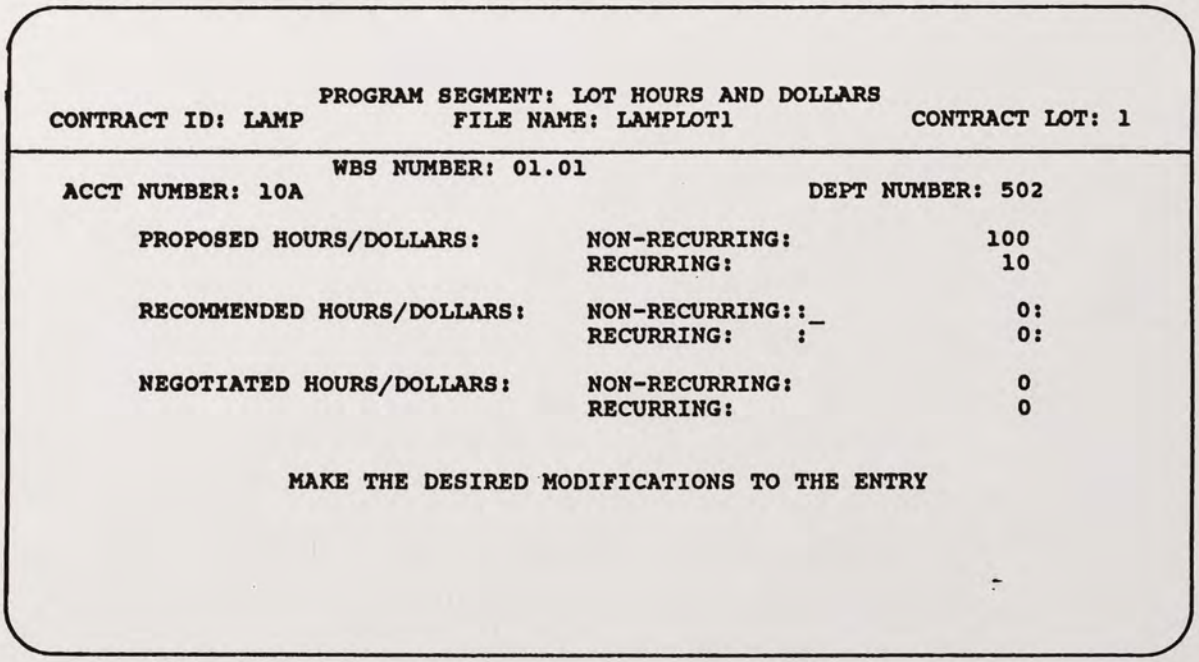


FIGURE 89

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                    WBS NUMBER: 01.01
ACCT NUMBER: 10A                                  DEPT NUMBER: 502

     PROPOSED HOURS/DOLLARS:        NON-RECURRING:              100
                                    RECURRING:                   10

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING:               70
                                    RECURRING:                   10

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING::_             0:
                                    RECURRING:    :              0:

               MAKE THE DESIRED MODIFICATIONS TO THE ENTRY
```

FIGURE 90

```
                    PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                    WBS NUMBER:01.01                          :
ACCT NUMBER:10A  :                                DEPT NUMBER:502  :

     PROPOSED HOURS/DOLLARS:        NON-RECURRING::             100:
                                    RECURRING:    :              10:

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING::              70:
                                    RECURRING:    .:             10:

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING::              75:
                                    RECURRING:    :              10:

               MAKE THE DESIRED MODIFICATIONS TO THE ENTRY
```

FIGURE 91

DEPT, and proposed non-recurring and recurring hours/dollars will be displayed on the screen for any desired changes to be made. For the recommended data (Figure 89), only the recommended non-recurring and recurring hours/dollars will be displayed on the screen for any desired changes to be made. For the negotiated data (Figure 90), only the negotiated non-recurring and recurring hours/dollars will be displayed on the screen for any desired changes to be made. And finally, for all of the data (Figure 91), the WBS number, ACCT number, DEPT, proposed non-recurring and recurring hours/dollars, recommended non-recurring and recurring hours/dollars , and the negotiated non-recurring and recurring hours/dollars will be displayed on the screen for any desired changes to be made. Once all desired modifications have been made and the user had pressed <return>'s through all of the data fields, the program will return the user to Step 59, Figure 78.

STEP 63: Entering an 'S' will allow the user to search through the data file for a specific data record to see if it exists, to see if it is correct, or to locate it for modification. When the user enters an 'S', the screen shown in Figure 92 is displayed. This requests the user to enter the WBS number, ACCT number, and DEPT that he/she wishes to locate within the data file. If the desired WBS number, ACCT number and DEPT is located, that entire record

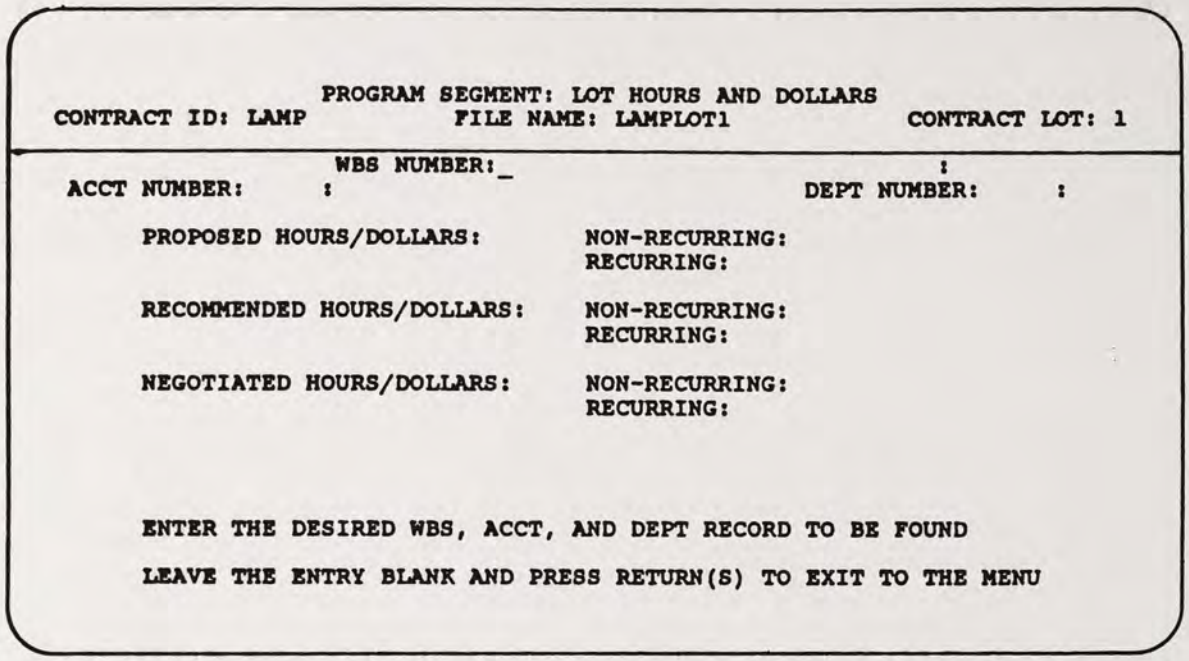


FIGURE 92

is displayed on the screen, and the user is return to Step 59, Figure 78, to allow him/her to review, modify, or delete the selected record. If the record displayed has the correct WBS number, ACCT number, and DEPT, but the hours/dollars displayed are not the entry that the user is looking for, the user should "next" through the next few records by selecting an 'N' from the menu displaying the records sequentially, since more than one record may exist with the same WBS number, ACCT number, and DEPT. All records with the same entries in these three key fields will be displayed sequentially.

If the desired WBS number, ACCT number, and DEPT is not located within the data file, an error message is

displayed to the user, and the user is asked to enter another WBS number, ACCT number, and DEPT. (See Figure 93.) If the user at this time does not wish to search for another record, simply press <return> (i.e., leave the WBS number, ACCT number, and DEPT entries blank) and return to Step 59, Figure 78.

```
                PROGRAM SEGMENT: LOT HOURS AND DOLLARS
CONTRACT ID: LAMP          FILE NAME: LAMPLOT1          CONTRACT LOT: 1

                WBS NUMBER:03.01                          :
ACCT NUMBER:101  :                                       DEPT:502  :

     PROPOSED HOURS/DOLLARS:        NON-RECURRING:
                                    RECURRING:

     RECOMMENDED HOURS/DOLLARS:     NON-RECURRING:
                                    RECURRING:

     NEGOTIATED HOURS/DOLLARS:      NON-RECURRING:
                                    RECURRING:


  THIS WBS, ACCT, AND DEPT RECORD DOES NOT EXIST IN THE DATABASE

           PRESS RETURN TO ENTER THE NEXT RECORD CHOICE
```

FIGURE 93

STEP 64: If the user has selected an 'R' to return to the main menu, to program will proceed to one of two possible places. If no records in the data file have been marked for deletion, the user will be returned directly to the program's main menu, Step 3, Figure 3. However, if any records were marked for deletion during the hours/dollars enter/edit routine, the screen shown in Figure 94 will be

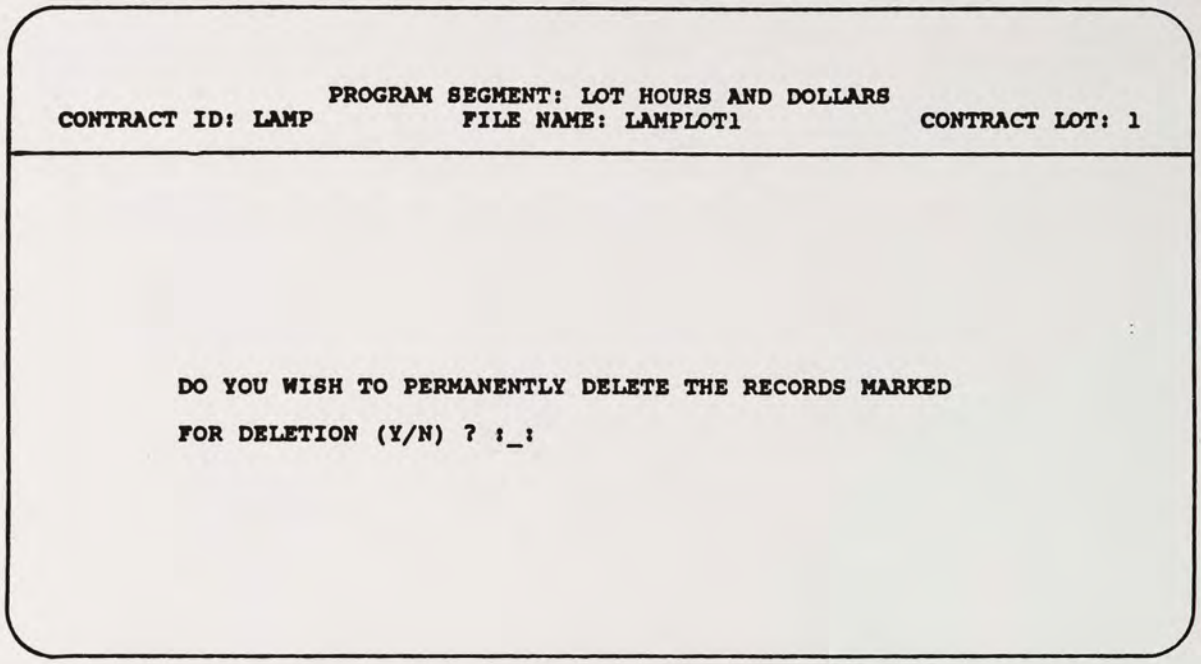


FIGURE 94

displayed, asking the user if he/she wants to permanently delete the records that he/she has marked for deletion. Note: A reply of 'Y' (yes) to this prompt will actually remove all of the records marked for deletion from the data file and reindex the data file. A reply of 'N' (no) to this prompt will leave all records in the file, including those marked for deletion. Records marked for deletion will not be included in any reports generated by this program. Any entry other than 'Y' or 'N' will cause an error message to be displayed on the screen, and will ask the user to make another entry.

STEP 65: Figure 95 displays the program's report menu. This screen, as well as all of the report generation

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP                                    CONTRACT LOT: 1

W - PRINT OUT THE WBS DATABASE FILE
C - PRINT OUT THE CLIN DATABASE FILE
A - PRINT OUT THE ACCT NUMBER DATABASE FILE
D - PRINT OUT THE DEPT DATABASE FILE
L - PRINT OUT THE LABOR RATES BY ACCOUNT NUMBER
B - PRINT OUT THE BURDEN RATES DATABASE FILE

E - EVALUATOR WORKSHEETS FOR ALL HOURS/DOLLARS BY WBS
S - SUMMARY OF HOURS/DOLLARS BY ACCT NUMBER BY DEPTS OR LOT

U - UNBURDENED PRICE BY ACCT NUMBER BY LOT OR CLIN
T - TOTAL PRICE (BURDENED) BY ACCT NUMBER BY LOT OR CLIN

F - CHANGE THE ACTIVE FILE (CONTRACT ID AND/OR LOT NUMBER)

R - RETURN TO THE MAIN MENU

                ENTER THE LETTER OF YOUR SELECTION:_:
```

FIGURE 95

screens, is set up with the top two lines providing general program information (i.e., active program segment, contract id, and lot number.

At this point the user may select from the menu which report he/she wishes to generate utilizing the specified contract and lot. If you select 'W' to print out the WBS (Work Breakdown Structure) database file, you should proceed to Step 66. If you select 'C' to print out the CLIN (Contract Line Item Number) database file, you should proceed to Step 71. If you select an 'A' to print our the ACCT (cost account) number database file, proceed to Step 72. If you select 'D' to print out the DEPT (department)

database file, proceed to Step 73. If you select 'L' to print out the labor rates by account number, proceed to Step 74. If you select 'B' to print out the burden rates database file, proceed to Step 75. If you select 'E' to print out evaluator worksheets for all hours/dollars by ACCT number by WBS number, proceed to Step 76. If you select 'S' to print our a summary of hours/dollars by ACCT number by departments or lot, proceed to Step 80. If you select 'U' to print out the unburdened price by ACCT number by lot or CLIN, proceed to Step 85. If you select a 'T' to print out the total price (burdened) by ACCT number by lot or CLIN, proceed to Step 90. If you select an 'F' to change the contract id and/or contract lot number, return to Step 2. If you select 'R' to return to the main menu, return to Step 3, Figure 3. If any character other than 'W', 'C', 'A', 'D', 'L', 'B', 'E', 'S', 'U', 'T', 'F', or 'R' is entered, an error message will be displayed, and a correction will be requested.

STEP 66: Figure 96 shows the screen which will be displayed when the user has elected to print out the WBS database file if the WBS file is found on the disk. If the WBS file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

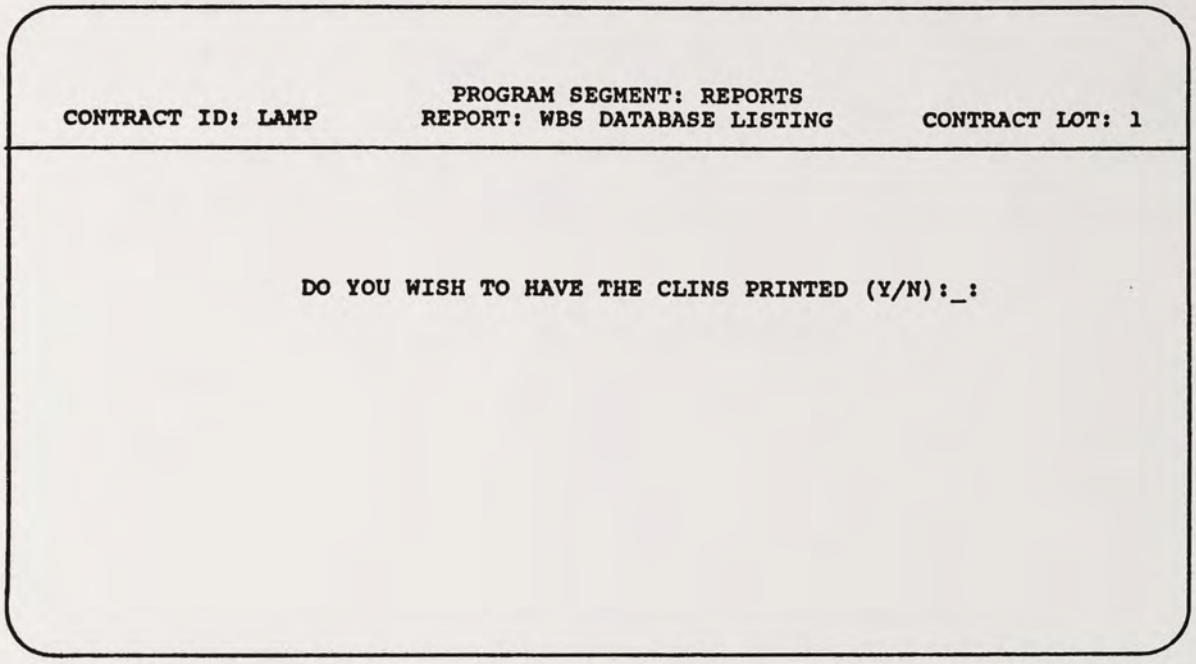


FIGURE 96

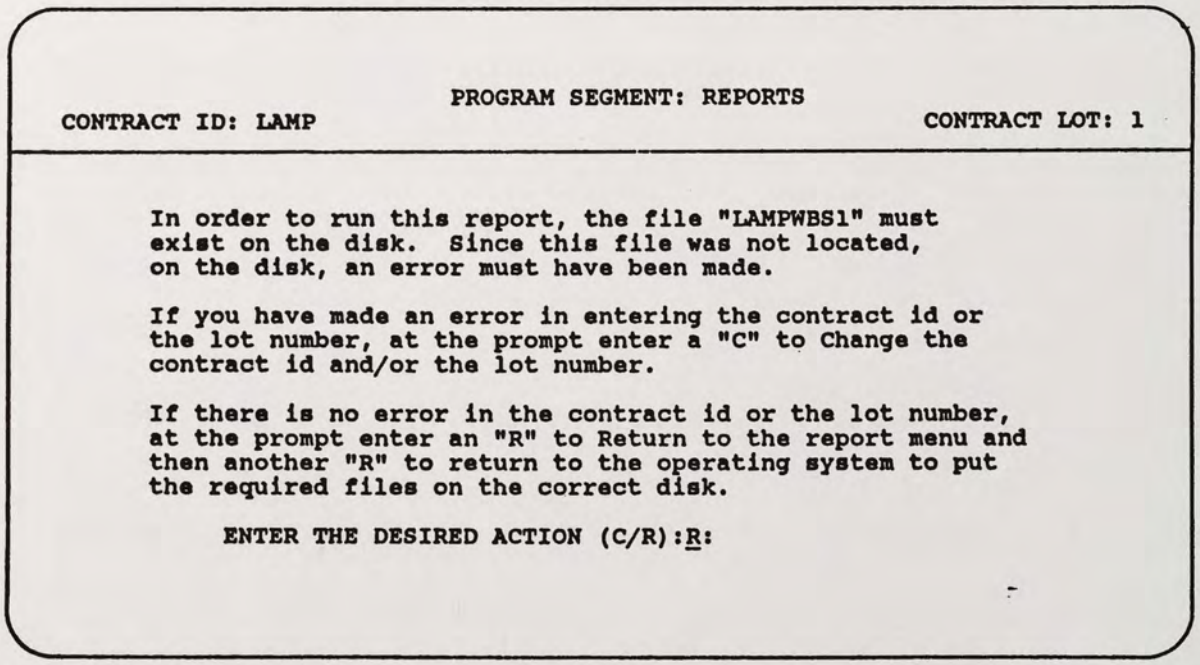


FIGURE 97

If the WBS file is located, the user is asked if the CLINs should be printed out with their associated WBS numbers. (See Figure 96.) Note that the name of the report to be printed out is displayed on the second line of the screen in this and all report screen displays. Enter a 'Y' if the CLIN numbers should be printed out with the WBS numbers and nomenclatures. If the CLINs should not be printed, enter an 'N'. Any entry other then a 'Y' or 'N' will produce an error message and the user will be asked to reenter his/her choice.

STEP 67: Figure 98 is the screen displayed to allow the user to select where the report generated is to be printed. Enter a 'P' to print the report out directly to the printer, and proceed to Step 68. Enter an 'F' to have the report printed out to a file, and proceed to Step 69. Any entry other than 'P' or 'F' will cause an error message to be displayed, and the user will be asked to reenter his/her selection.

STEP 68: If the user elects to print the report to the printer, the user is asked to verify that the printer is indeed set up and that the top of form has been set. (See Figure 99.) This report, as well as all of the other reports generated, requires the capability to print out 132 characters on a single line, so the printer should be set up accordingly. Once the printer is set up, press <return>

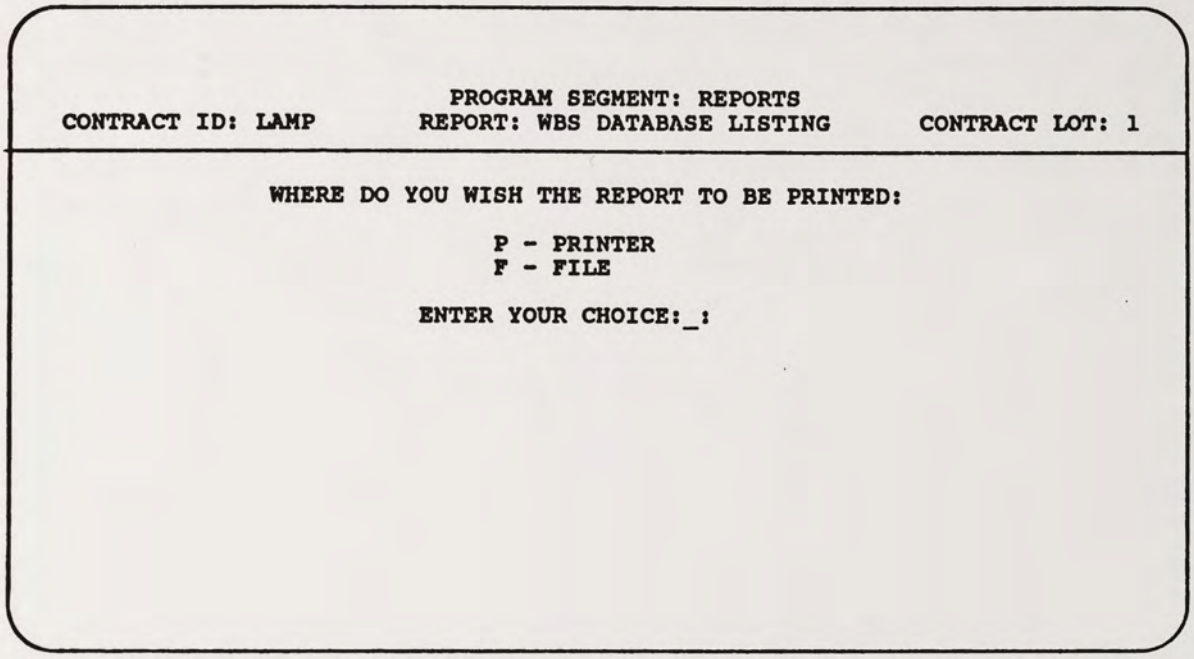


FIGURE 98

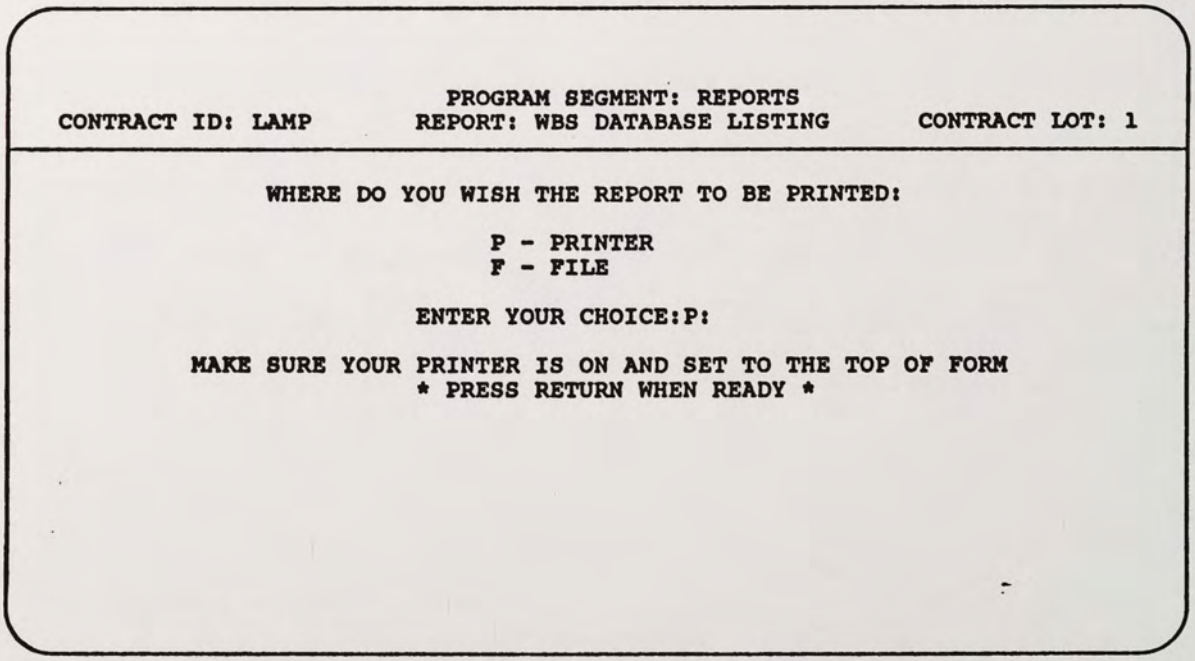


FIGURE 99

and Figure 100 is displayed indicating that the report is being printed. Once the report is complete, another message is provided (Figure 101) stating that the report is complete, and requesting the user to press <return> to continue. The user is then returned to the report menu, Step 65, Figure 95.

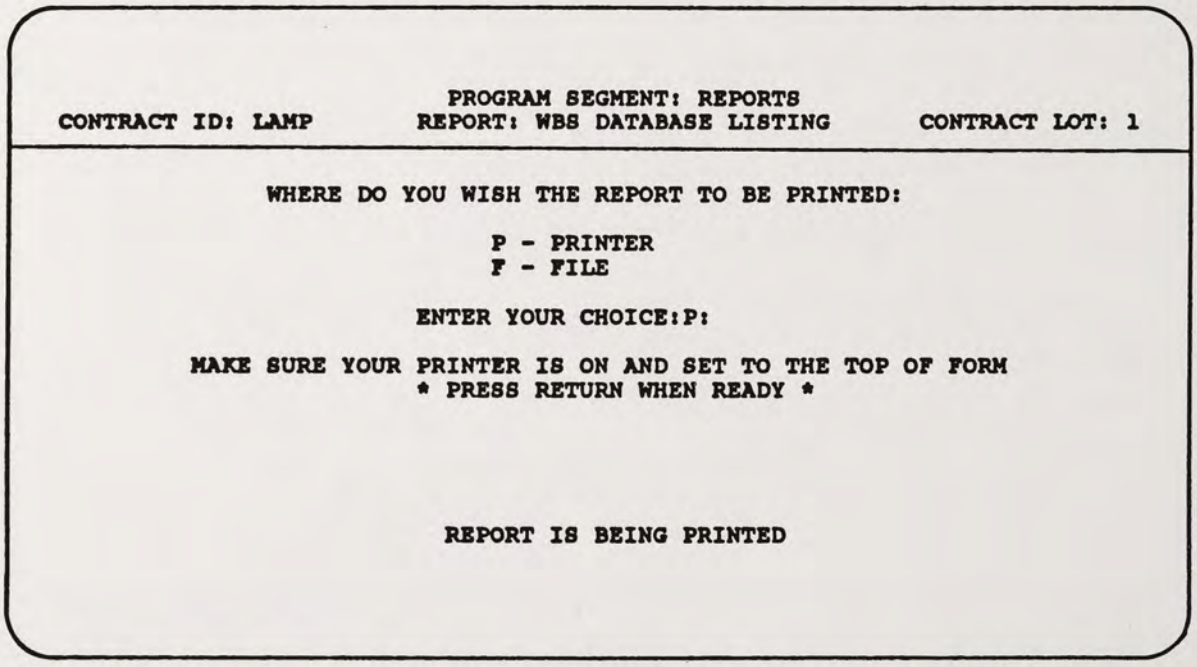


FIGURE 100

STEP 69: If the user elects to print the report out to a file, the user is then asked to enter the name of the file that he/she wishes to have the report printed to. (See Figure 102). Once a file name is entered, the program appends the file extension '.PRN' to the use supplied file name, then checks to see if a file with the same name already exists on the disk. If the file name is not

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP      REPORT: WBS DATABASE LISTING      CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                        P - PRINTER
                        F - FILE

                    ENTER YOUR CHOICE:P:

        MAKE SURE YOUR PRINTER IS ON AND SET TO THE TOP OF FORM
                    * PRESS RETURN WHEN READY *



                      REPORT IS BEING PRINTED

        * REPORT COMPLETE - PRESS RETURN TO CONTINUE *
```

FIGURE 101

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP      REPORT: WBS DATABASE LISTING      CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                        P - PRINTER
                        F - FILE

                    ENTER YOUR CHOICE:F:

        ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                        FILENAME:_       :
```

FIGURE 102

located on the disk, the report is generated (Figure 103), and once it is complete, the user will be requested to press <return> (Figure 104) to return to the report menu, Step 65, Figure 95. If the file name already exists on the disk, proceed to Step 70.

```
                        PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP       REPORT: WBS DATABASE LISTING      CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                        P - PRINTER
                        F - FILE

                    ENTER YOUR CHOICE:F:

        ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                        FILENAME:TEMP    :



                REPORT IS BEING PUT IN THE FILE 'TEMP.PRN'
```

FIGURE 103

STEP 70: If the file name entered by the user is determined to already exist on the disk, a message is displayed to determine if the user wishes to delete the existing file (Figure 105). Enter an 'N' to save the existing file, and return to Step 69 to enter a different filename. Enter a 'Y' to delete the existing file and print the report out to the specified file. (See Figure 106.) When the report is complete, press <return> to return to the report menu (Figure 107), Step 65, Figure 95.

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP         REPORT: WBS DATABASE LISTING        CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                          P - PRINTER
                          F - FILE

                        ENTER YOUR CHOICE:F:

      ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                        FILENAME:TEMP     :



          REPORT IS BEING PUT IN THE FILE 'TEMP.PRN'

        * REPORT COMPLETE - PRESS RETURN TO CONTINUE *
```

FIGURE 104

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP         REPORT: WBS DATABASE LISTING        CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                          P - PRINTER
                          F - FILE

                        ENTER YOUR CHOICE:F:

      ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                        FILENAME:TEMP     :

        THIS FILE ALREADY EXISTS - DO YOU WISH TO DELETE THE
        PREVIOUS FILE (Y/N):_:
```

FIGURE 105

```
                    PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP   REPORT: WBS DATABASE LISTING   CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                    P - PRINTER
                    F - FILE

                ENTER YOUR CHOICE:F:

      ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                    FILENAME:TEMP    :

        THIS FILE ALREADY EXISTS - DO YOU WISH TO DELETE THE
        PREVIOUS FILE (Y/N):Y:


            REPORT IS BEING PUT IN THE FILE 'TEMP.PRN'
```

FIGURE 106

```
                    PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP   REPORT: WBS DATABASE LISTING   CONTRACT LOT: 1

        WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                    P - PRINTER
                    F - FILE

                ENTER YOUR CHOICE:F:

      ENTER THE NAME OF THE FILE THAT YOU WISH TO PRINT TO:
                    FILENAME:TEMP    :

        THIS FILE ALREADY EXISTS - DO YOU WISH TO DELETE THE
        PREVIOUS FILE (Y/N):Y:


            REPORT IS BEING PUT IN THE FILE 'TEMP.PRN'

          * REPORT COMPLETE - PRESS RETURN TO CONTINUE *
```

FIGURE 107

STEP 71: Figure 108 shows the screen which will be displayed when the user has elected to print out the CLIN database file if the CLIN file is found on the disk. If the CLIN file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

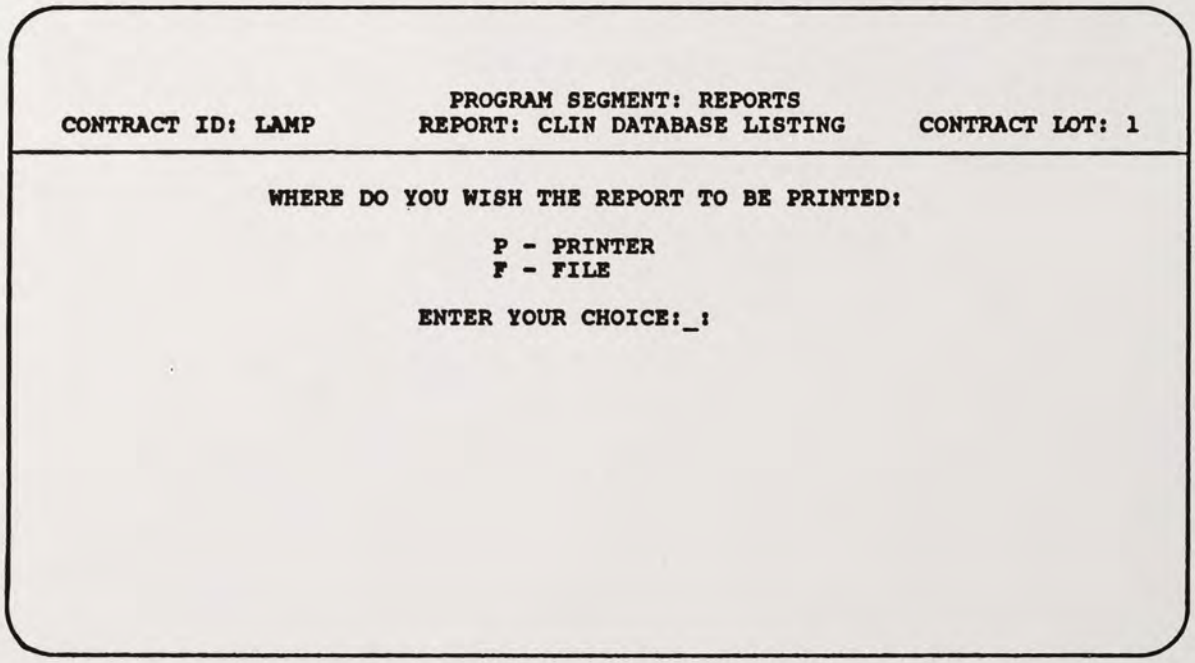


FIGURE 108

When the CLIN file is located, the user is immediately asked where the report is to be printed. (See Figure 108.) Note that the name of the report to be printed out is displayed on the second line of the screen in this and all report screen displays. Return to steps 67 through 70,

figures 98 through 107, to complete the actual printing of the CLIN database file.

STEP 72: Figure 109 shows the screen which will be displayed when the user has elected to print out the ACCT number database file if the ACCT file is found on the disk. If the ACCT file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

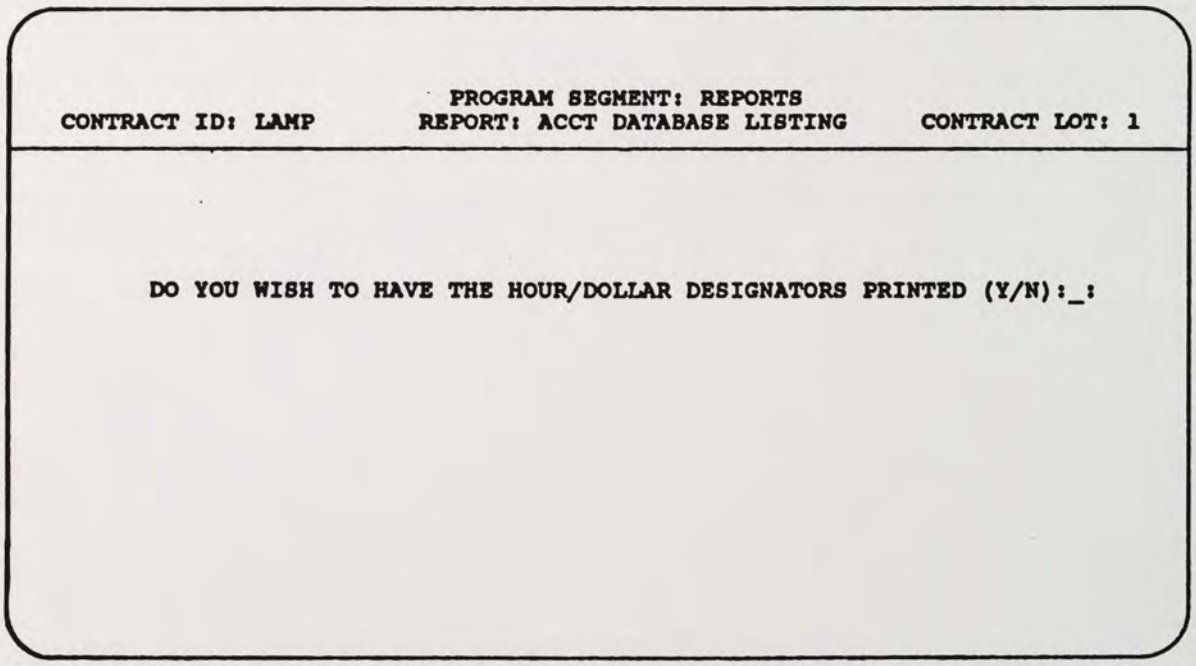


FIGURE 109

If the ACCT file is located, the user is asked if the hour/dollar designators should be printed out with their associated ACCT numbers. (See Figure 109.) Note that the

name of the report to be printed out is displayed on the second line of the screen in this and all report screen displays. Enter a 'Y' if the hour/dollar designators should be printed out with the ACCT numbers and nomenclatures. If the hour/dollar designator should not be printed, enter an 'N'. Any entry other then a 'Y' or 'N' will produce an error message and the user will be asked to reenter his/her choice.

Figure 110 is the screen displayed to allow the user to select where the report is to be printed. Return to steps 67 through 70, figures 98 through 107, to complete the actual printing of the ACCT database file.

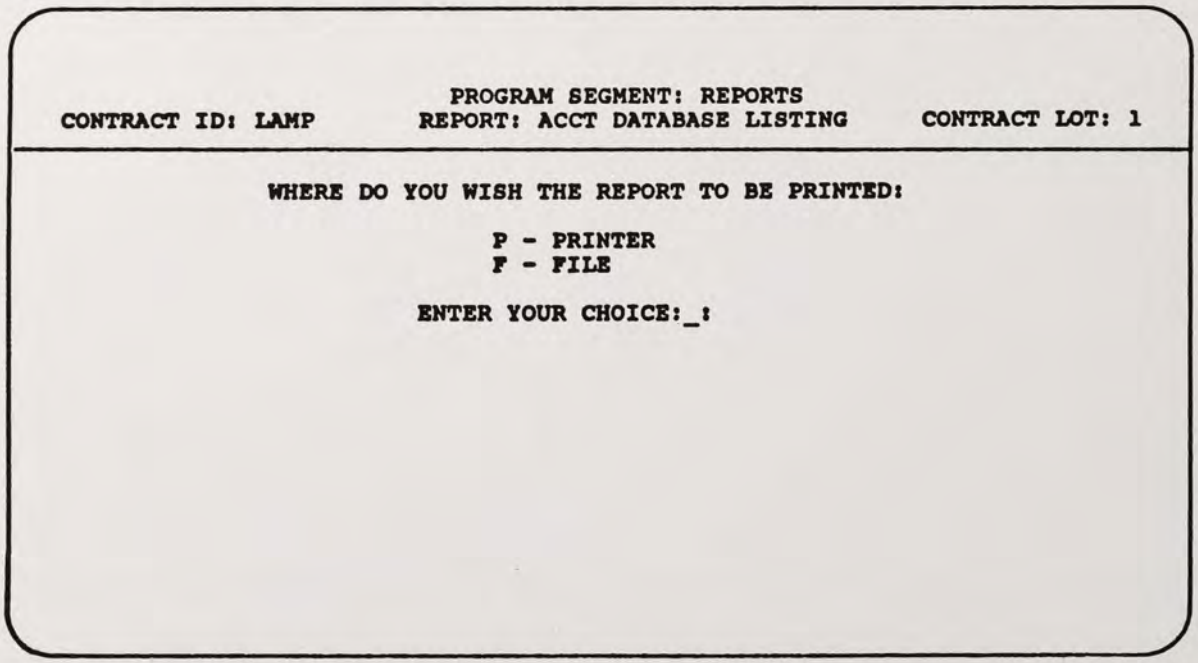


FIGURE 110

STEP 73: Figure 111 shows the screen which will be displayed when the user has elected to print out the DEPT

database file if the DEPT file is found on the disk. If the DEPT file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

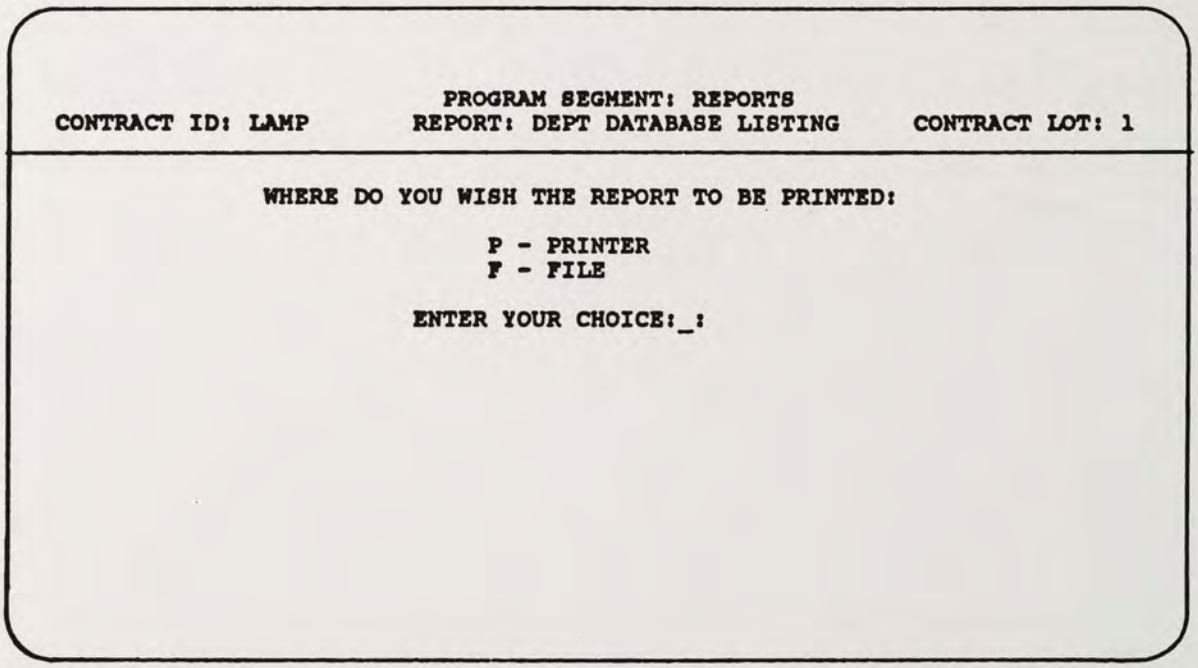


FIGURE 111

When the DEPT file is located, the user is immediately asked where the report is to be printed. (See Figure 111.) Note that the name of the report to be printed out is displayed on the second line of the screen in this and all report screen displays. Return to steps 67 through 70, figures 98 through 107, to complete the actual printing of the DEPT database file.

STEP 74: Figure 112 shows the screen which will be displayed when the user has elected to print out the labor rates' database file if the ACCT file is found on the disk. If the ACCT file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

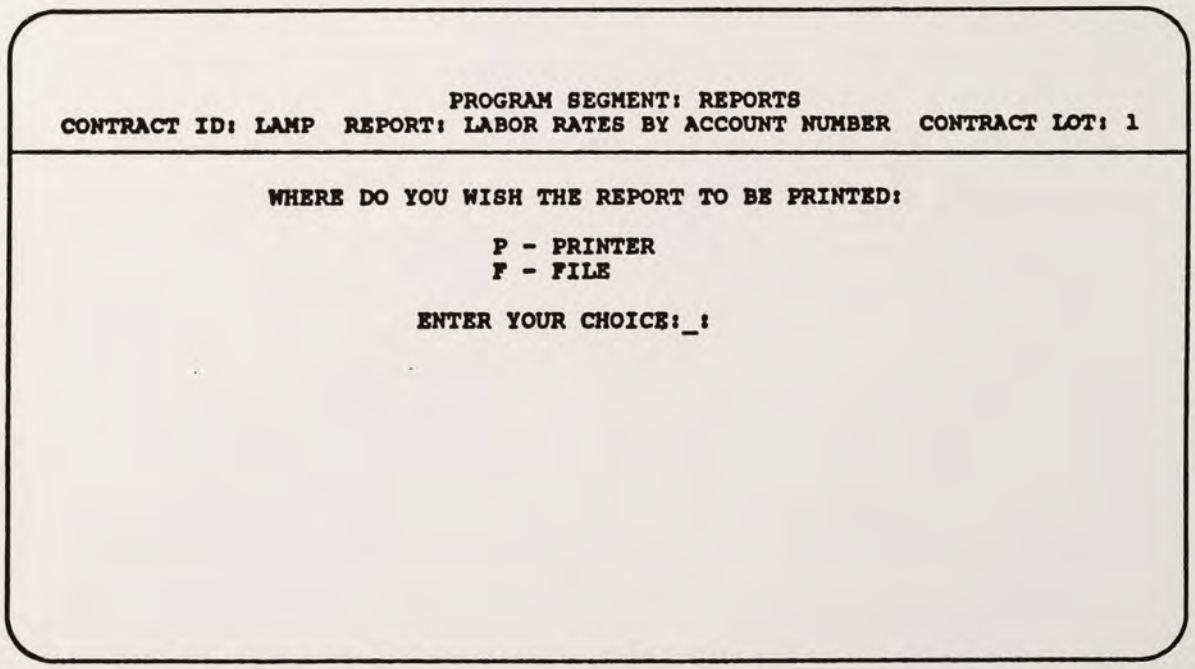


FIGURE 112

When the ACCT file is located, the user is immediately asked where the report is to be printed. (See Figure 112.) Note that the name of the report to be printed out is displayed on the second line of the screen in this and all report screen displays. Return to steps 67 through 70,

figures 98 through 107, to complete the actual printing of the labor rates database file.

STEP 75: Figure 113 shows the screen which will be displayed when the user has elected to print out the burden rates database file if the BDN file is found on the disk. If the BDN file is not found on the disk, the message shown in Figure 97 is displayed to the user allowing the user to correct an incorrect contract id or lot number as presented in Step 2, or to return to the report menu to locate the missing file.

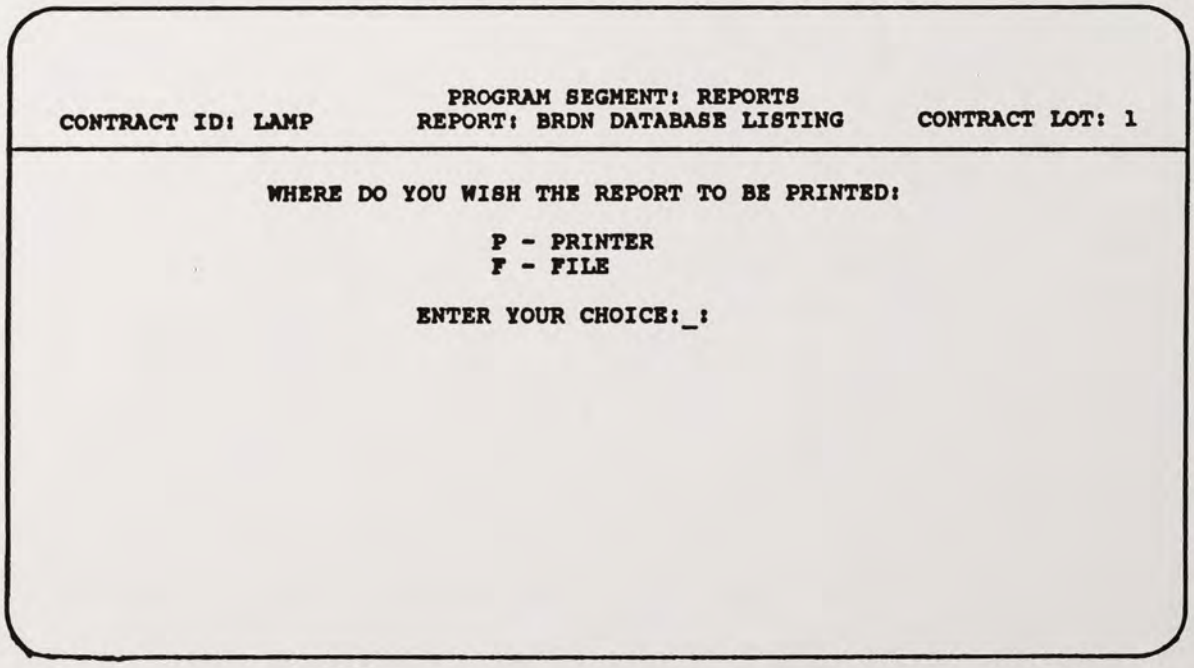


FIGURE 113

When the BDN file is located, the user is immediately asked where the report is to be printed. (See Figure 113.) Note that the name of the report to be printed out is displayed on the second line of the screen in this and all

report screen displays. Return to steps 67 through 70, figures 98 through 107, to complete the actual printing of the labor rates database file.

STEP 76: Figure 114 shows the screen displayed when the user has elected to print out the evaluator worksheets for all hours/dollars by ACCT number by WBS number if all of the required database files are located on the disk. If any of the required files are missing to produce the evaluator worksheets, a message is displayed to the user (Figure 76), and the user is returned to the report menu, Step 65, Figure 95.

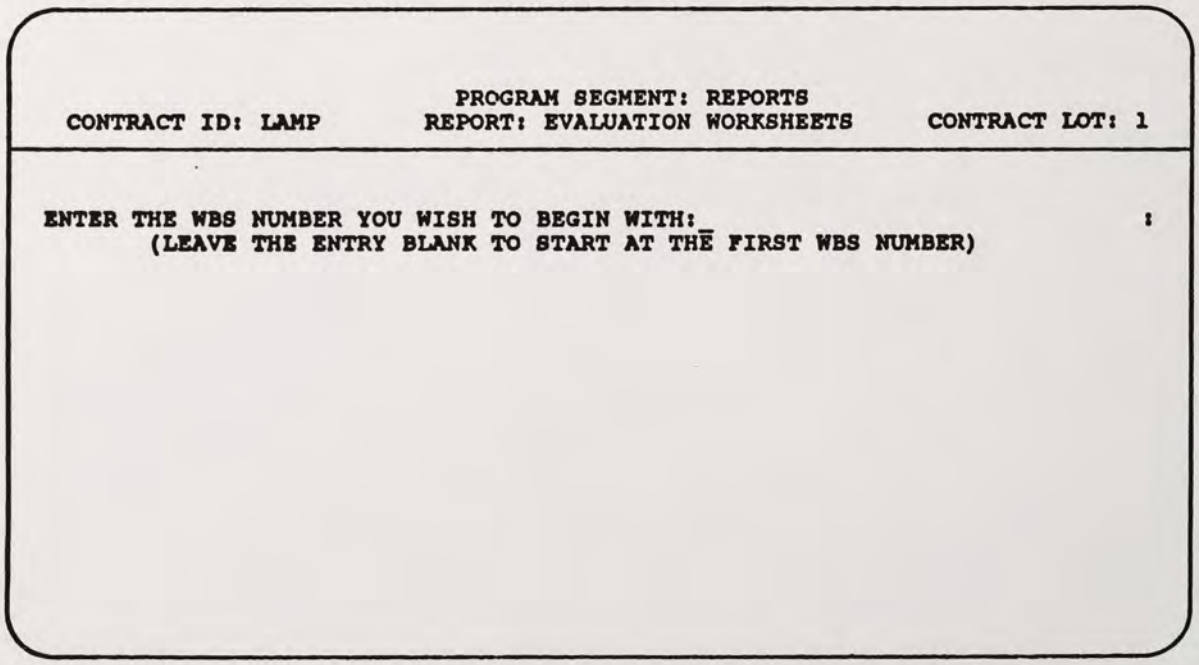


FIGURE 114

Since the user may not desire to print all of the WBS number evaluation sheets at one time, the user is requested

to enter the first WBS number for which an evaluation worksheet is to be generated. If you wish to begin with the first WBS number in the file, simply press <return> (leaving the WBS number entry blank). To start with any other WBS number, the actual WBS number must be entered.

If a WBS number is entered that is not located within the WBS file, an error message will be displayed to the user (Figure 115), the user will be requested to reenter the starting WBS number. If the WBS number is located, proceed to Step 77.

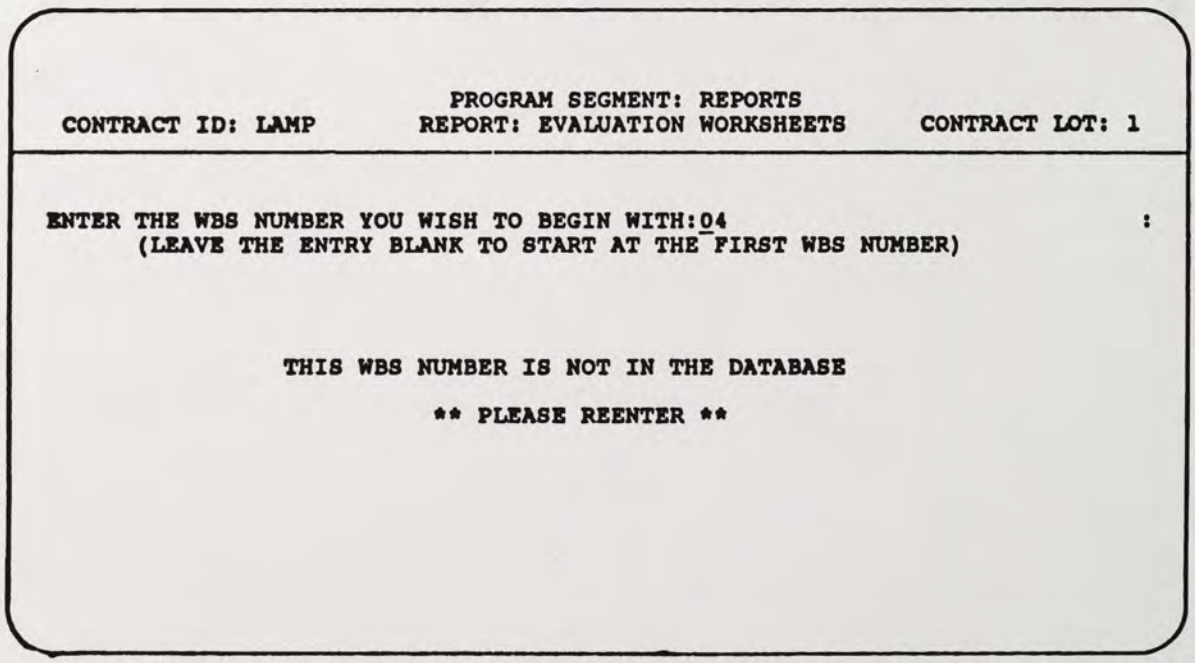


FIGURE 115

STEP 77: Figure 116 shows the screen displayed when the starting WBS number has been entered and located within the WBS file. At this time the user may enter the WBS

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP      REPORT: EVALUATION WORKSHEETS      CONTRACT LOT: 1

ENTER THE WBS NUMBER YOU WISH TO BEGIN WITH:01                              :
       (LEAVE THE ENTRY BLANK TO START AT THE FIRST WBS NUMBER)

ENTER THE WBS NUMBER YOU WISH TO END WITH:_                                  :
       (LEAVE THE ENTRY BLANK TO END AT THE LAST WBS NUMBER)
```

FIGURE 116

number for which the last evaluator's worksheet is to be generated. If you wish to produce evaluator worksheets for all of the remaining WBS numbers, simply press <return> (leaving the ending WBS number entry blank) to produce sheets for the remaining WBS numbers. To end with any other WBS number, the actual ending WBS number must be entered.

If a WBS number is entered that is not located within the WBS file, an error message will be displayed to the user similar to that shown in Figure 115, and the user will be requested to reenter the starting WBS number. If the WBS number is located, proceed to Step 78.

STEP 78: Figure 117 shows the screen displayed to the user once the starting and ending WBS numbers have been

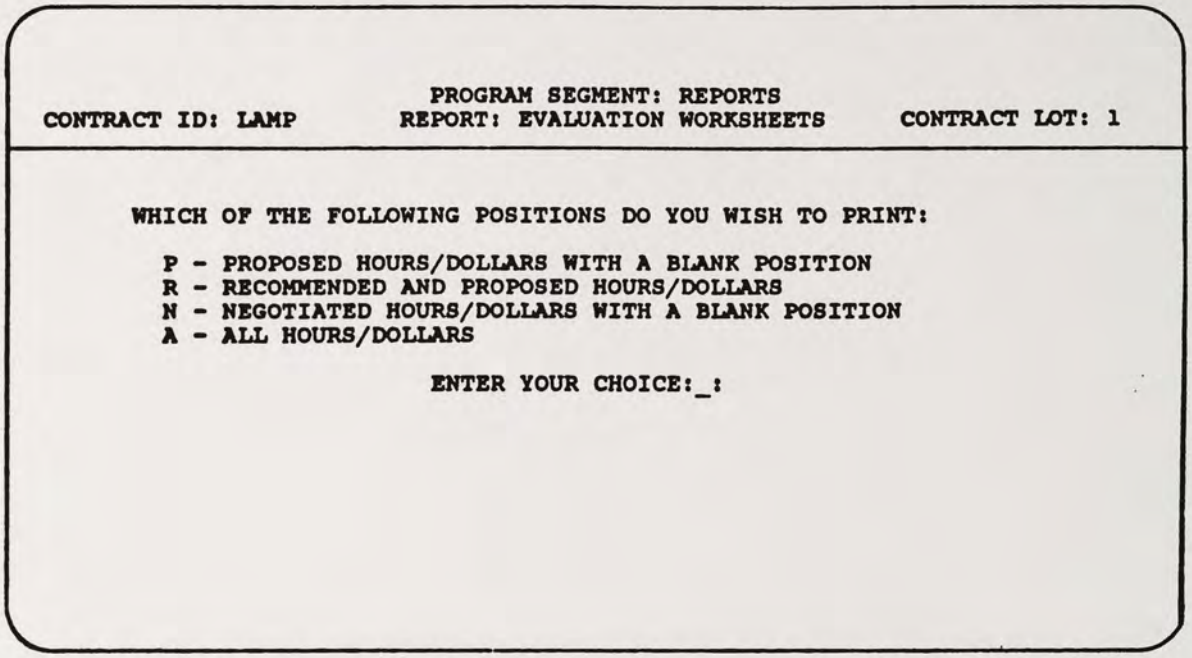


FIGURE 117

entered. At this time the user may select the specific position(s) that he/she wishes to have displayed on the evaluator worksheets. Enter a 'P' to print out only the proposed hours/dollars with a corresponding blank position. Enter an 'R' to print out both the proposed and recommended hours/dollars. Enter an 'N' to print out the negotiated hours/dollars with a corresponding blank position. Enter an 'A' to print out the proposed, recommended, and negotiated positions in a single report. Any entry other than 'P', 'R', 'N', or 'A' will result in an error message being displayed to the user, and the user will be asked to reenter his/her choice.

STEP 79: Figure 118 is the screen displayed to allow the user to select where the report is to be printed.

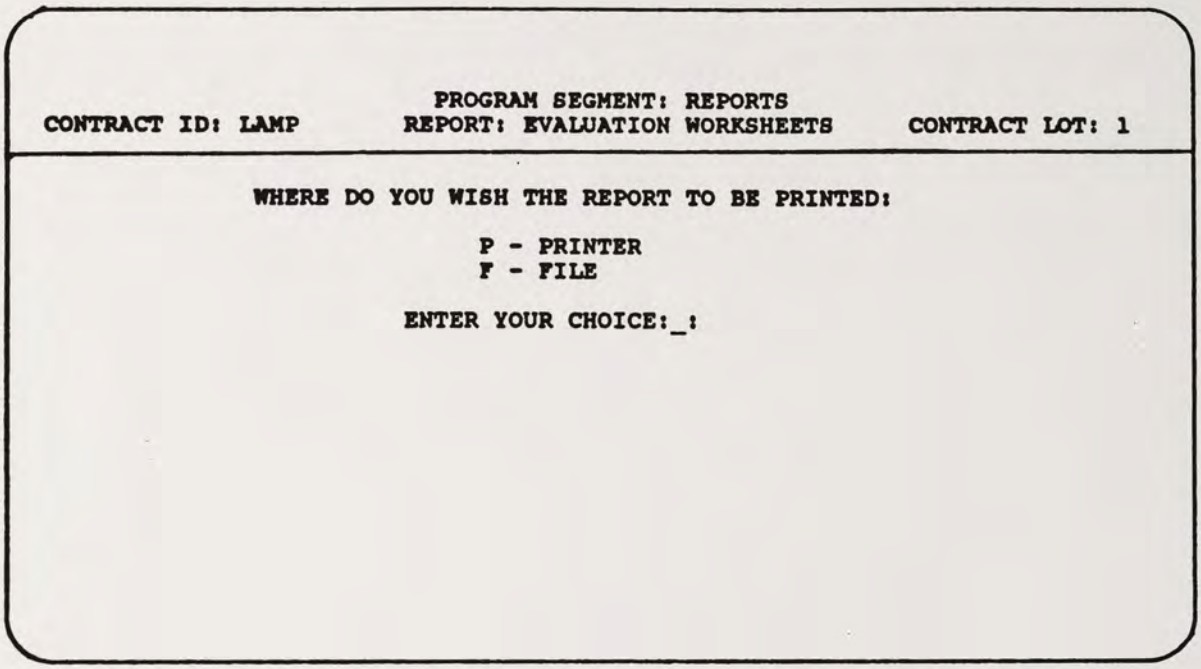


FIGURE 118

Return to steps 67 through 70, figures 98 through 105, to complete the actual printing of the evaluator worksheets. An added feature to the printing of the evaluator worksheets is shown in Figure 119. While the report is being generated, the start and stop WBS numbers are displayed to the user, and the actual WBS number being presently printed is shown on the screen. This will allow the user to monitor the progress of the report generation process. When the report is complete, a message is displayed to the user (Figure 120), and the user should press <return> to return to the report menu, Step 65, Figure 95.

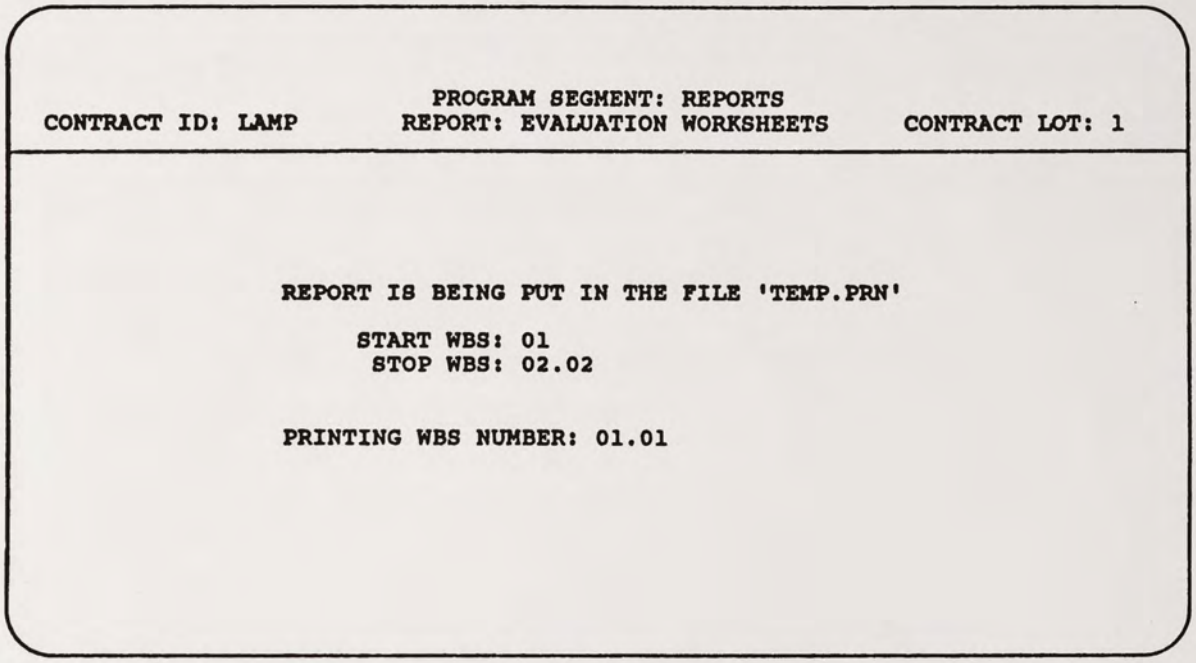


FIGURE 119

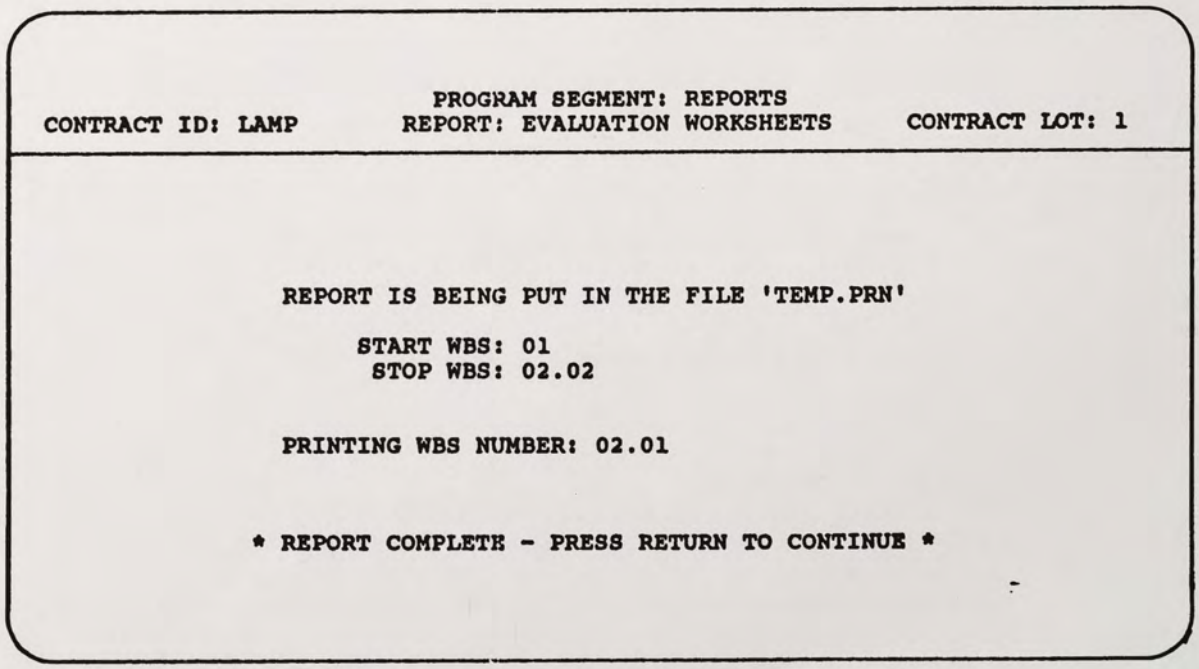


FIGURE 120

STEP 80: Figure 121 shows the screen displayed when the user had elected to print out a summary of the hours/dollars by ACCT number by departments or lot if all of the required database files are located on the disk. If any of the required files are missing to produce the summaries, a message is displayed to the user (Figure 76), and the user is returned to the report menu, Step 65, Figure 95.

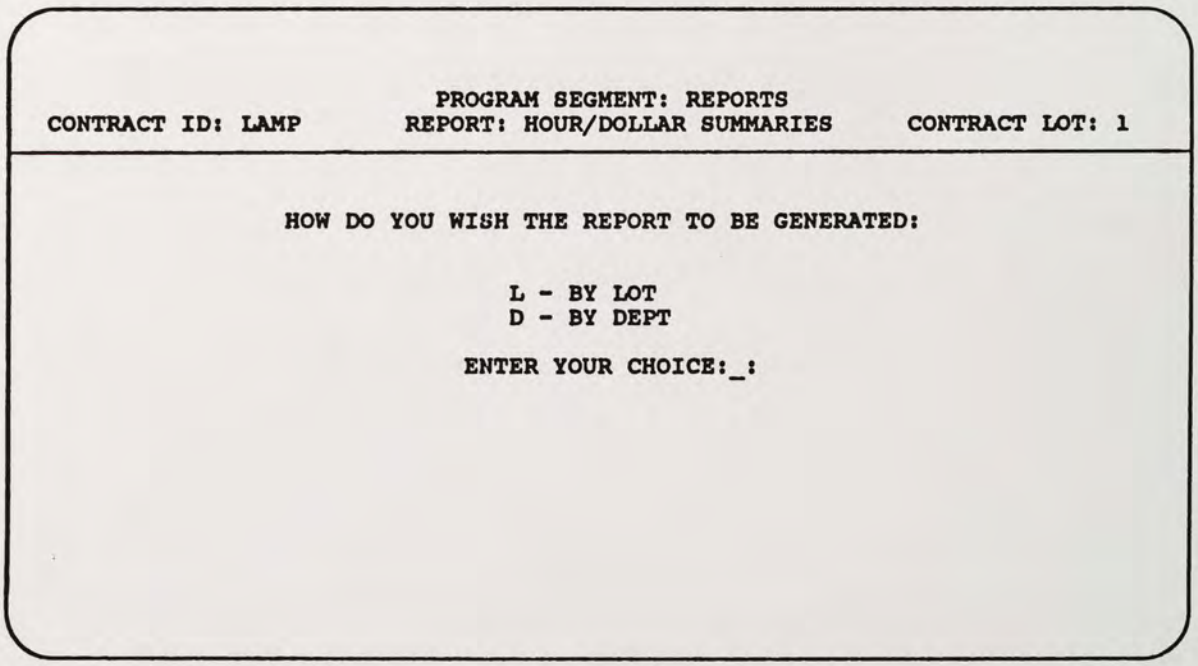


FIGURE 121

Enter a 'D' to print out summaries for a specified set of departments and proceed to Step 81. Enter an 'L' to print out the summary for an entire lot and proceed to Step 83. Any entry other then 'D' or 'L' will cause an error

message to be displayed, and the user will be asked to reenter his/her selection.

STEP 81: Since the user may not desire to print summaries of all of the departments at one time, the user is requested to enter the first department for which a summary is to be generated. (See Figure 122.) If you wish to begin with the first department in the file, simply press <return> (leaving the department entry blank). To start with any other department, the actual department must be entered.

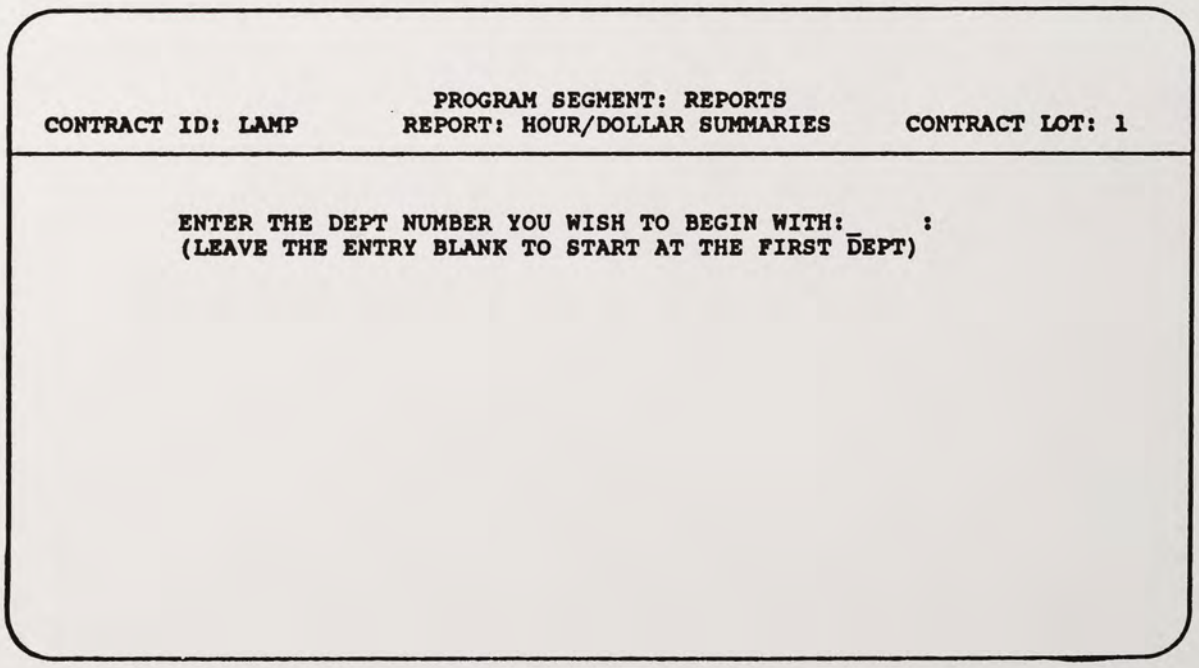


FIGURE 122

If a department is entered that is not located within the DEPT file, an error message will be displayed to the user (Figure 123), the user will be requested to reenter

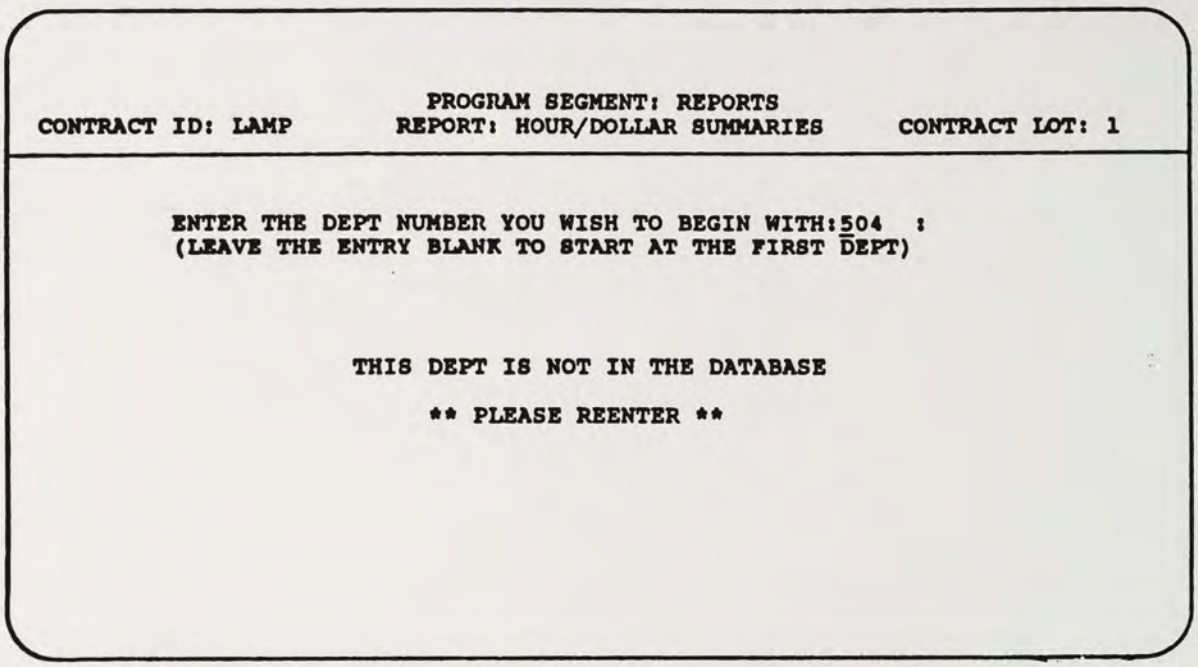


FIGURE 123

the starting department. If the department is located, proceed to Step 82.

STEP 82: Figure 124 shows the screen displayed when the starting department has been entered and located within the DEPT file. At this time the user may enter the department for which the last summary is to be generated. If you wish to produce summaries for all of the remaining departments, simply press <return> (leaving the ending department entry blank) to produce sheets for the remaining departments. To end with any other department, the actual ending department must be entered.

If a department is entered that is not located within the DEPT file, an error message will be displayed to the

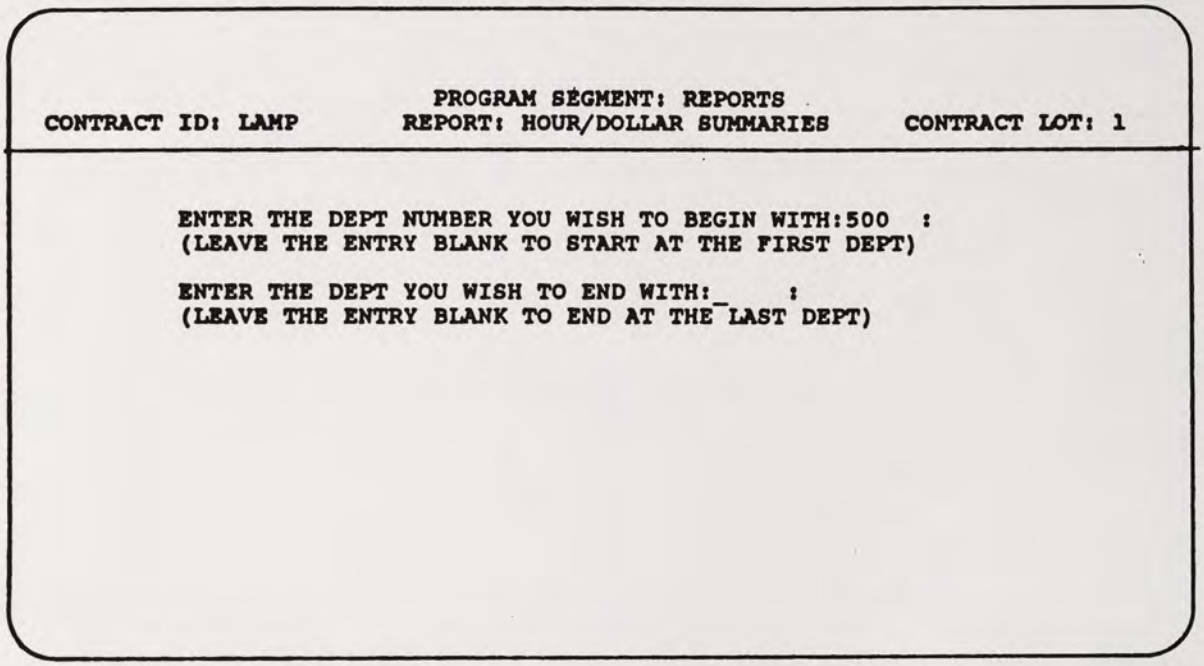


FIGURE 124

user similar to that shown in Figure 123, and the user will be requested to reenter the starting department. If the department is located, proceed to Step 83.

STEP 83: Figure 125 shows the screen displayed to the user once the user has entered the starting and ending departments or the user has elected to complete a summary for the entire lot. At this time the user may select the specific position(s) that he/she wishes to have summarized. Enter a 'P' to print out only the proposed hours/dollars with a corresponding blank position. Enter an 'R' to print out both the proposed and recommended hours/dollars, as

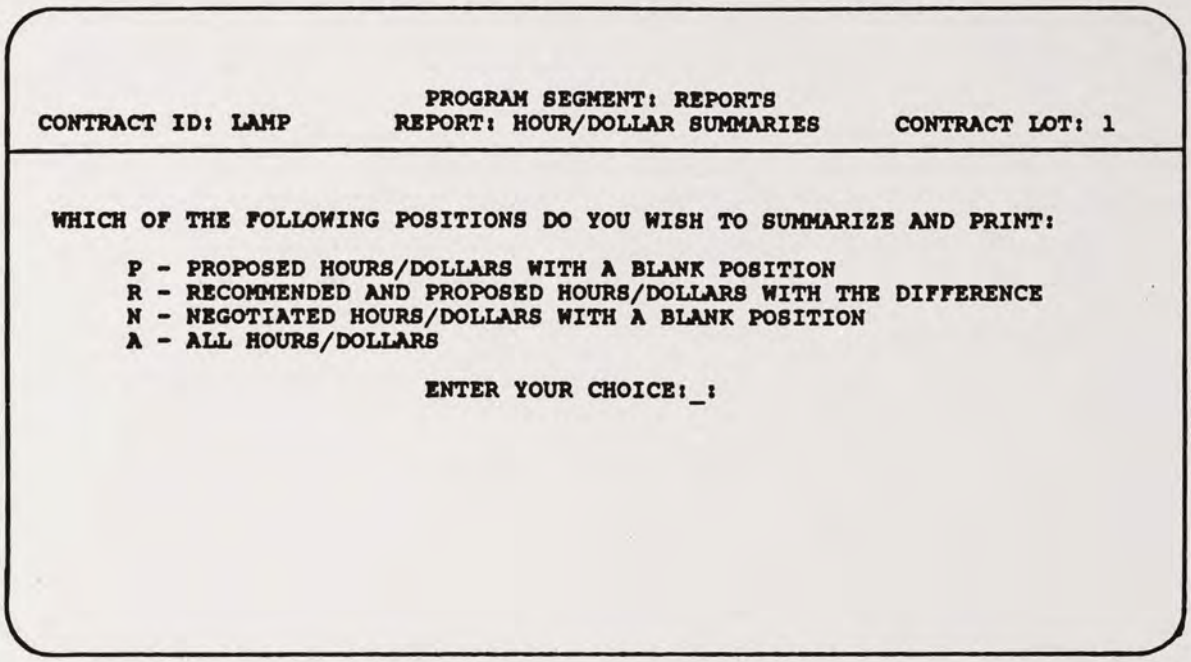


FIGURE 125

well as the difference between the two positions. Enter an 'N' to print out the negotiated hours/dollars with a corresponding blank position. Enter an 'A' to print out the proposed, recommended, and negotiated positions in a single report. Any entry other than 'P', 'R', 'N', or 'A' will result in an error message being displayed to the user, and the user will be asked to reenter his/her choice.

STEP 84: Figure 126 is the screen displayed to allow the user to select where the report is to be printed. Return to steps 67 through 70, figures 98 through 105, to complete the actual printing of the summary reports. While the report is being prepared, status messages will be

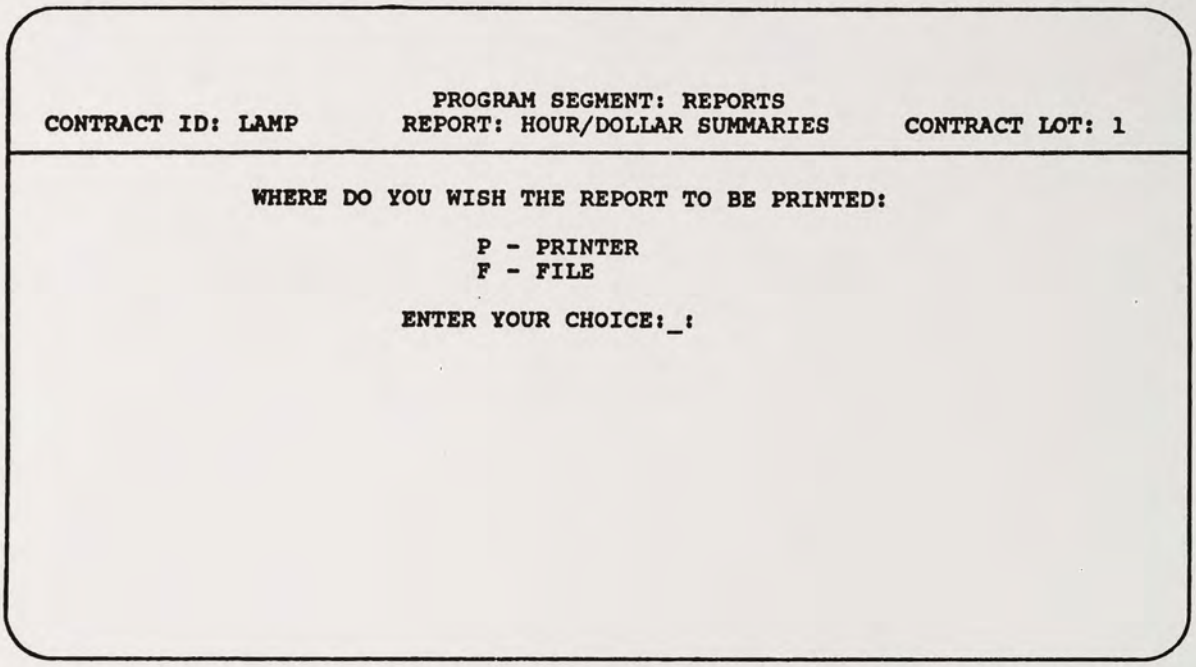


FIGURE 126

displayed, allowing the user to know that the report generation process is underway. (See Figure 127.)

An added feature to the printing of the summaries by department is shown in Figure 128. While the report is being generated, the start and stop departments are displayed to the user, and the actual department being presently printed is shown on the screen. This will allow the user to monitor the progress of the report generation process.

When the report is complete, whether generated for an entire lot or for a specified group of departments, a message is displayed to the user (Figure 129), and the user

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP         REPORT: HOUR/DOLLAR SUMMARIES      CONTRACT LOT: 1

                        FILE IS BEING REINDEXED

                        REPORT IS BEING PREPARED
```

FIGURE 127

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP         REPORT: HOUR/DOLLAR SUMMARIES      CONTRACT LOT: 1

                REPORT IS BEING PUT IN THE FILE 'TEMP.PRN'

                              START DEPT: 500
                               STOP DEPT: 502

                          PRINTING DEPARTMENT: 502
```

FIGURE 128

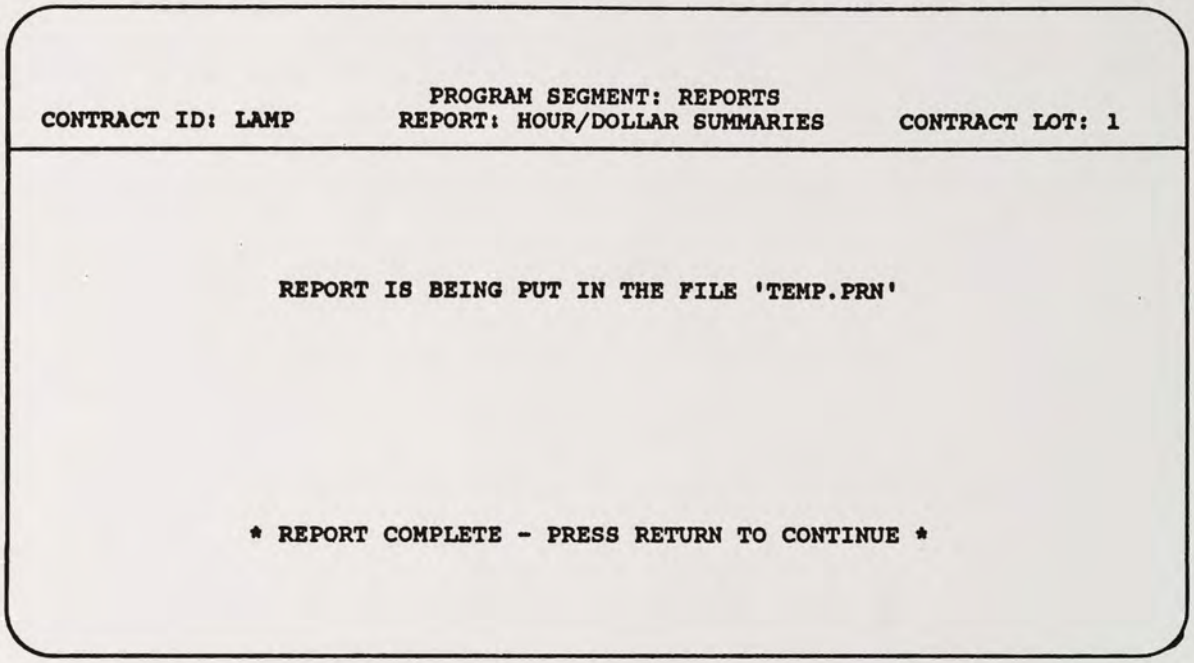


FIGURE 129

should press <return> to return to the report menu, Step 65, Figure 95.

STEP 85: Figure 130 shows the screen displayed when the user had elected to print out the unburdened price by ACCT number by CLIN or lot if all of the required database files are located on the disk. If any of the required files are missing to produce the reports, a message is displayed to the user (Figure 76), and the user is returned to the report menu, Step 65, Figure 95.

Enter a 'C' to print out prices for a specified set of CLINs and proceed to Step 86. Enter an 'L' to print out the unburdened price for an entire lot and proceed to Step

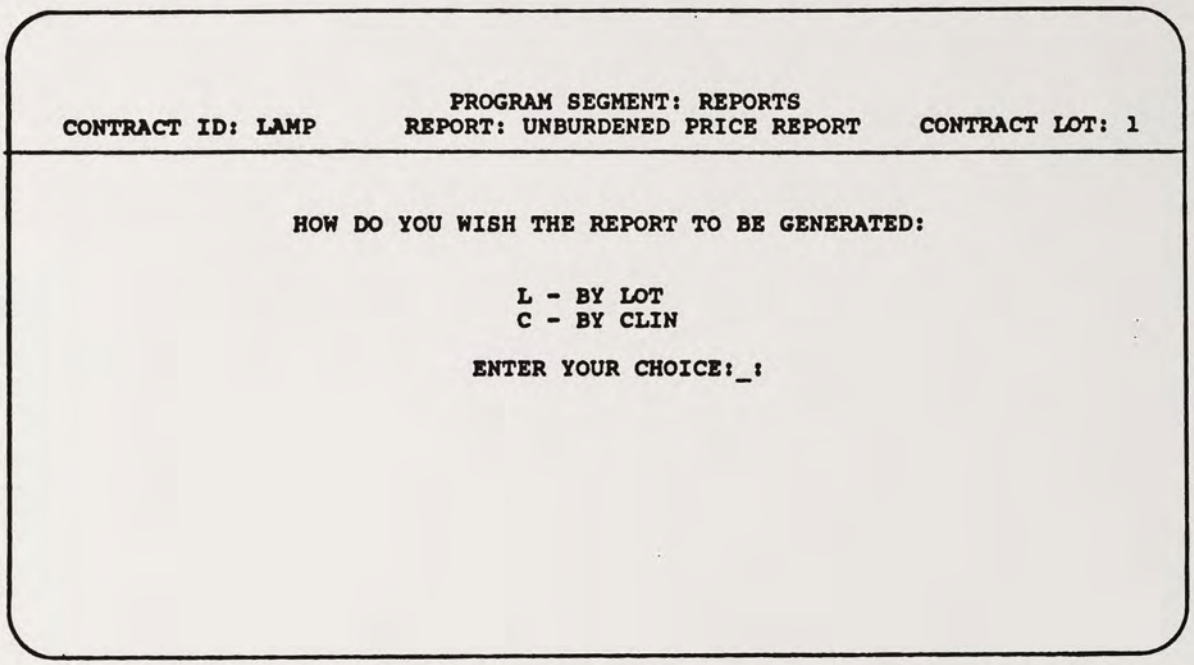


FIGURE 130

88. Any entry other then 'C' or 'L' will cause an error message to be displayed, and the user will be asked to reenter his/her selection.

STEP 86: Since the user may not desire to print unburdened prices for all of the CLINs at one time, the user is requested to enter the first CLIN for which an unburdened price is to be generated. (See Figure 131.) If you wish to begin with the first CLIN in the file, simply press <return> (leaving the CLIN entry blank). To start with any other CLIN, the actual CLIN must be entered.

If a CLIN is entered that is not located within the CLIN file, an error message will be displayed to the user

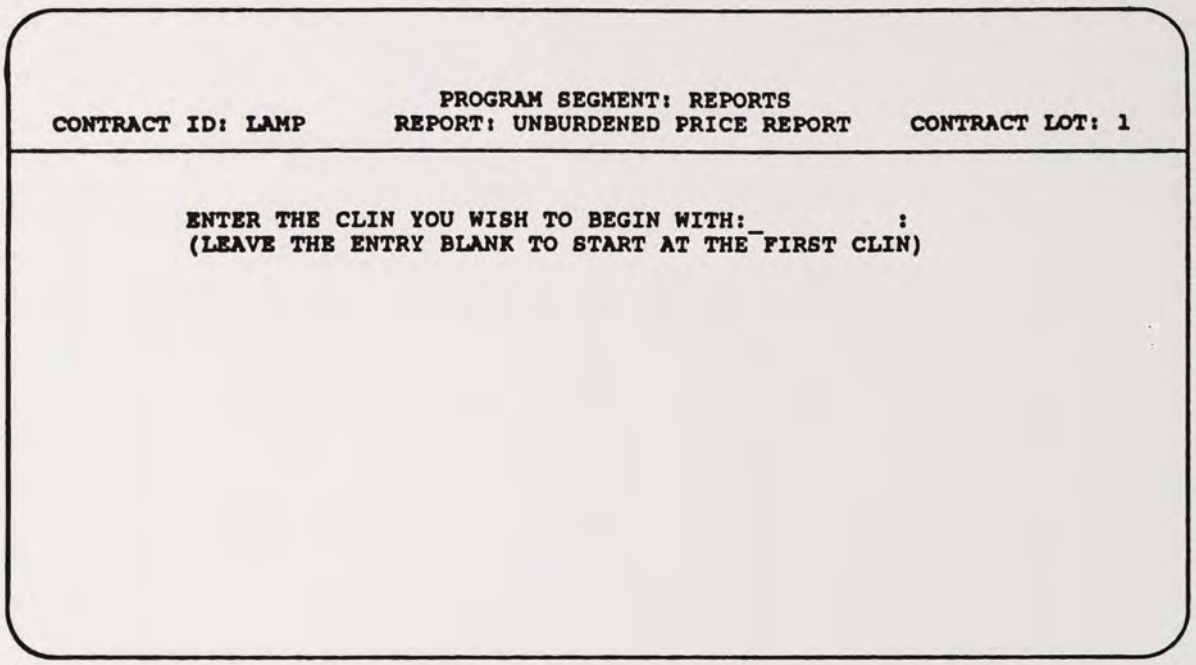


FIGURE 131

(Figure 132), the user will be requested to reenter the starting CLIN. If the CLIN is located, proceed to Step 87.

STEP 87: Figure 133 shows the screen displayed when the starting CLIN has been entered and located within the CLIN file. At this time the user may enter the CLIN for which the last unburdened price is to be generated. If you wish to produce unburdened prices for all of the remaining CLINs simply press <return> (leaving the ending CLIN entry blank) to produce sheets for the remaining CLINs. To end with any other CLIN, the actual ending CLIN must be entered.

If a CLIN is entered that is not located within the CLIN file, an error message will be displayed to the user

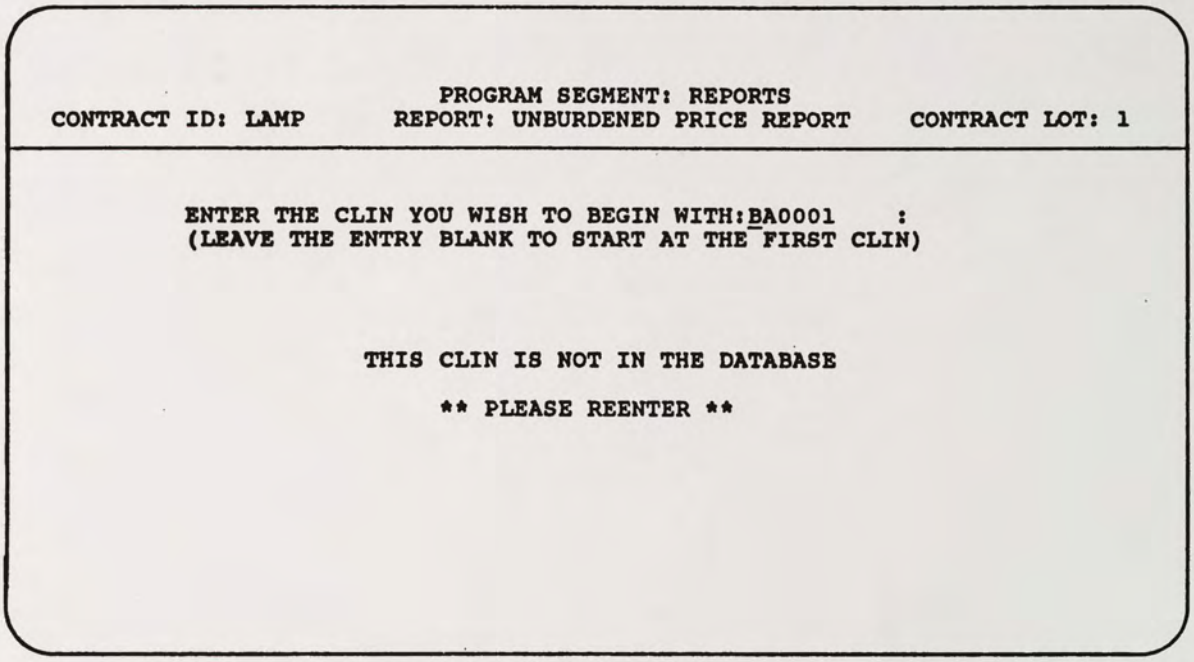


FIGURE 132

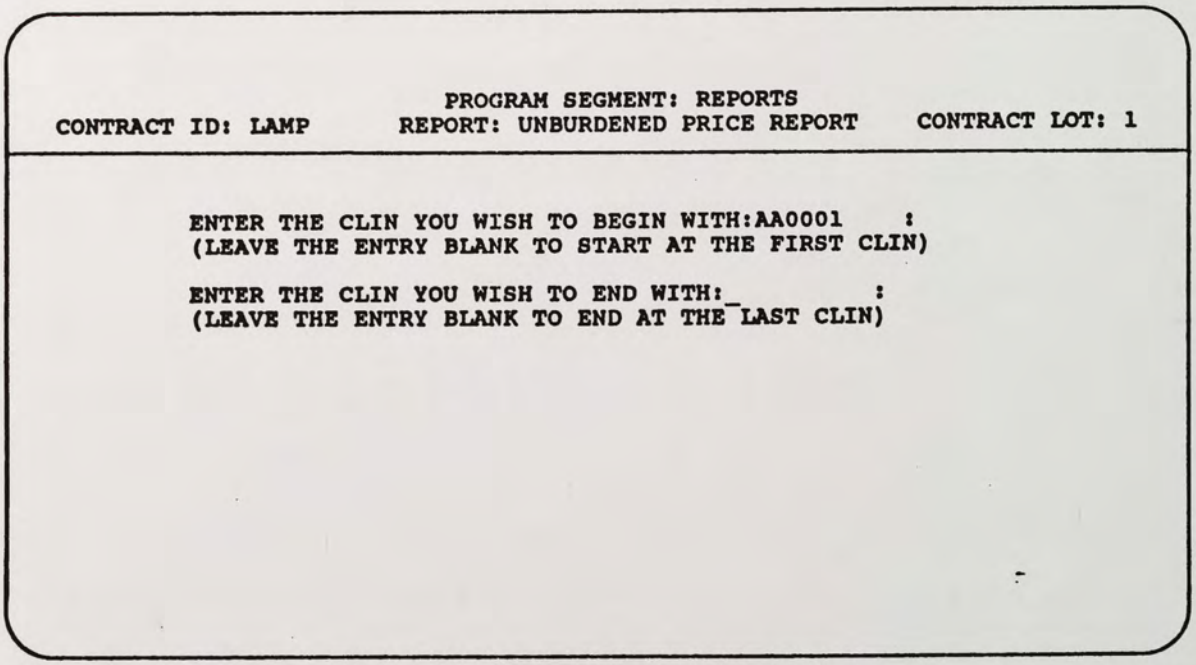


FIGURE 133

similar to that shown in Figure 132, and the user will be requested to reenter the starting CLIN. If the CLIN is located, proceed to Step 88.

STEP 88: Figure 134 shows the screen displayed to the user once the user has entered the starting and ending CLINs or the user has elected to complete the unburdened price for the entire lot. At this time the user may select the specific position that he/she wishes to have priced. Enter a 'P' to price the proposed hours/dollars. Enter an 'R' to price the recommended hours/dollars. Enter an 'N' to price the negotiated hours/dollars. Any entry other than 'P', 'R', or 'N' will result in an error message being displayed to the user, and the user will be asked to reenter his/her choice.

STEP 89: Figure 135 is the screen displayed to allow the user to select where the report is to be printed. Return to steps 67 through 70, figures 98 through 105, to complete the actual printing of the unburdened pricing reports. While the report is being prepared, status messages will be displayed, allowing the user to know that the report generation process is underway. (See Figure 136.)

An added feature to the printing of the unburdened prices by CLIN is shown in Figure 137. While the report is being generated, the start and stop CLINs are displayed to the user, and the actual CLIN being presently printed is

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP      REPORT: UNBURDENED PRICE REPORT     CONTRACT LOT: 1

WHICH OF THE FOLLOWING POSITIONS DO YOU WISH TO PRICE AND PRINT:

                    P - PROPOSED HOURS/DOLLARS
                    R - RECOMMENDED HOURS/DOLLARS
                    N - NEGOTIATED HOURS/DOLLARS

                         ENTER YOUR CHOICE:_:
```

FIGURE 134

```
                          PROGRAM SEGMENT: REPORTS
CONTRACT ID: LAMP      REPORT: UNBURDENED PRICE REPORT     CONTRACT LOT: 1

                WHERE DO YOU WISH THE REPORT TO BE PRINTED:

                              P - PRINTER
                              F - FILE

                           ENTER YOUR CHOICE:_:
```

FIGURE 135

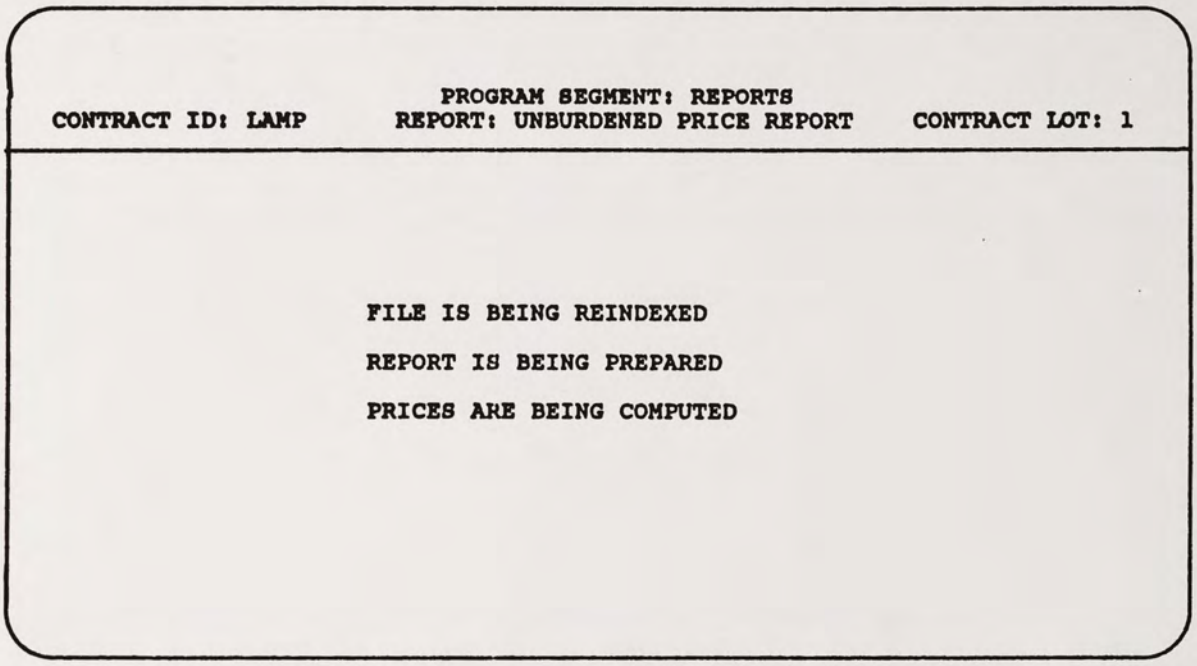


FIGURE 136

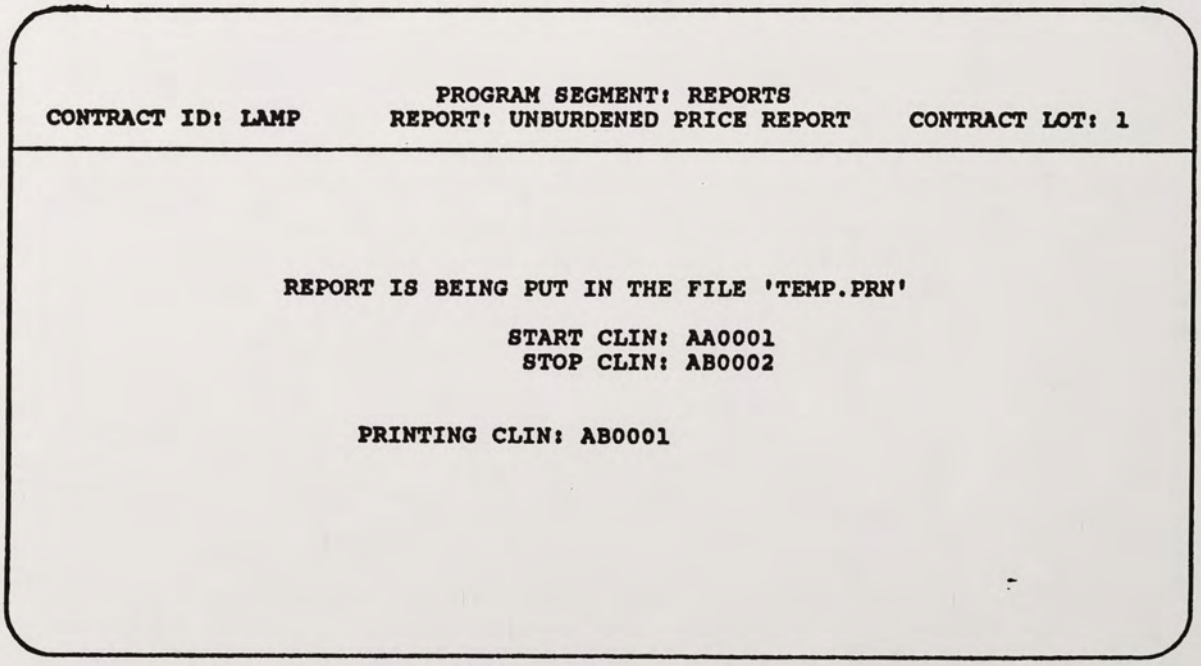


FIGURE 137

shown on the screen. This will allow the user to monitor the progress of the report generation process.

When the report is complete, whether generated for an entire lot or for a specified group of CLINs, a message is displayed to the user (Figure 138), and the user should press <return> to return to the report menu, Step 65, Figure 95.

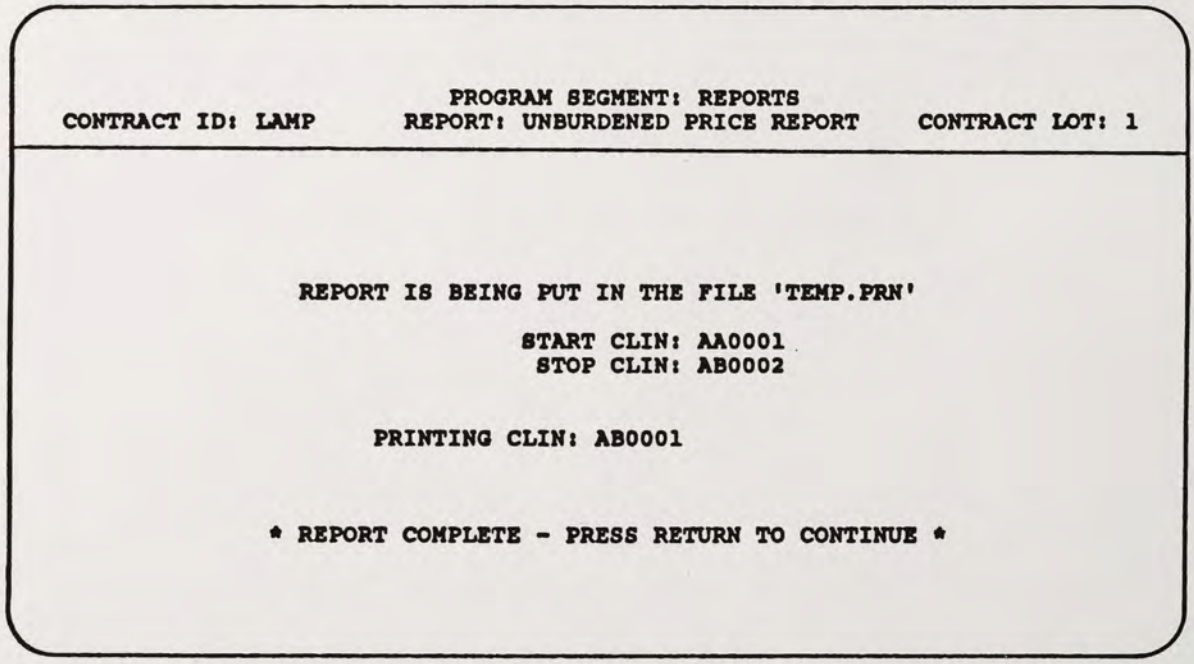


FIGURE 138

STEP 90: Figure 139 shows the screen displayed when the user had elected to print out the total (burdened) price by ACCT number by CLIN or lot if all of the required database files are located on the disk. If any of the required files are missing to produce the reports, a

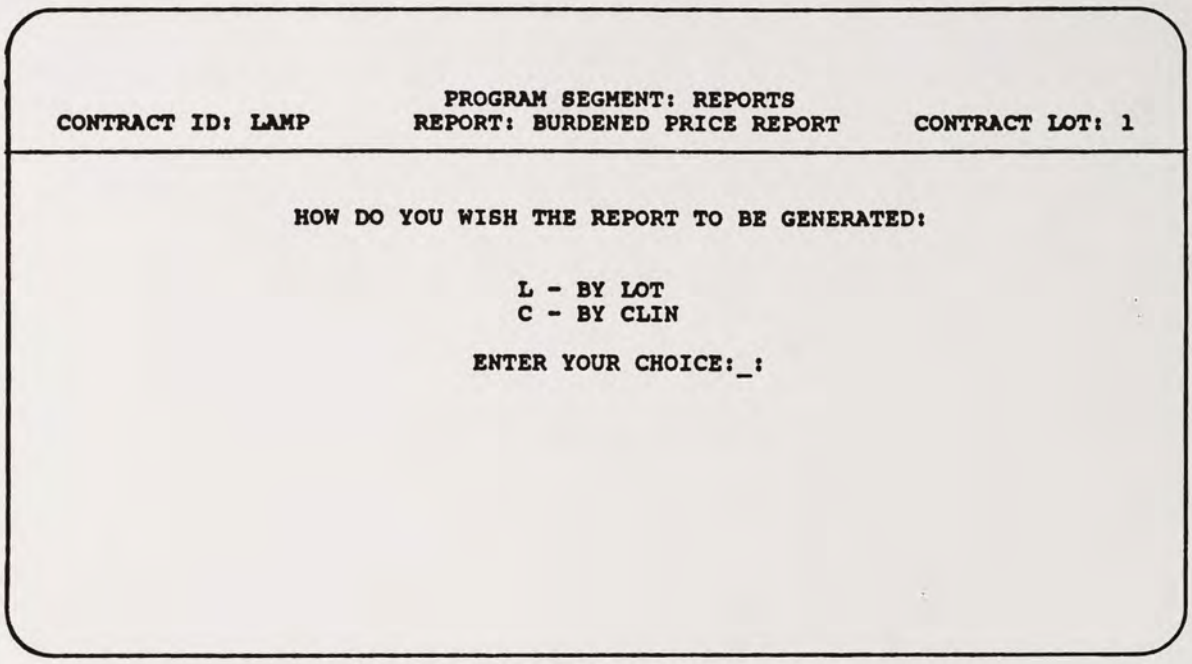


FIGURE 139

message is displayed to the user (Figure 76), and the user is returned to the report menu, Step 65, Figure 95.

Enter a 'C' to print out prices for a specified set of CLINs and proceed to Step 91. Enter an 'L' to print out the total price for an entire lot and proceed to Step 93. Any entry other then 'C' or 'L' will cause an error message to be displayed, and the user will be asked to reenter his/her selection.

STEP 91: Since the user may not desire to print burdened prices for all of the CLINs at one time, the user is requested to enter the first CLIN for which an burdened price is to be generated. (See Figure 140.) If

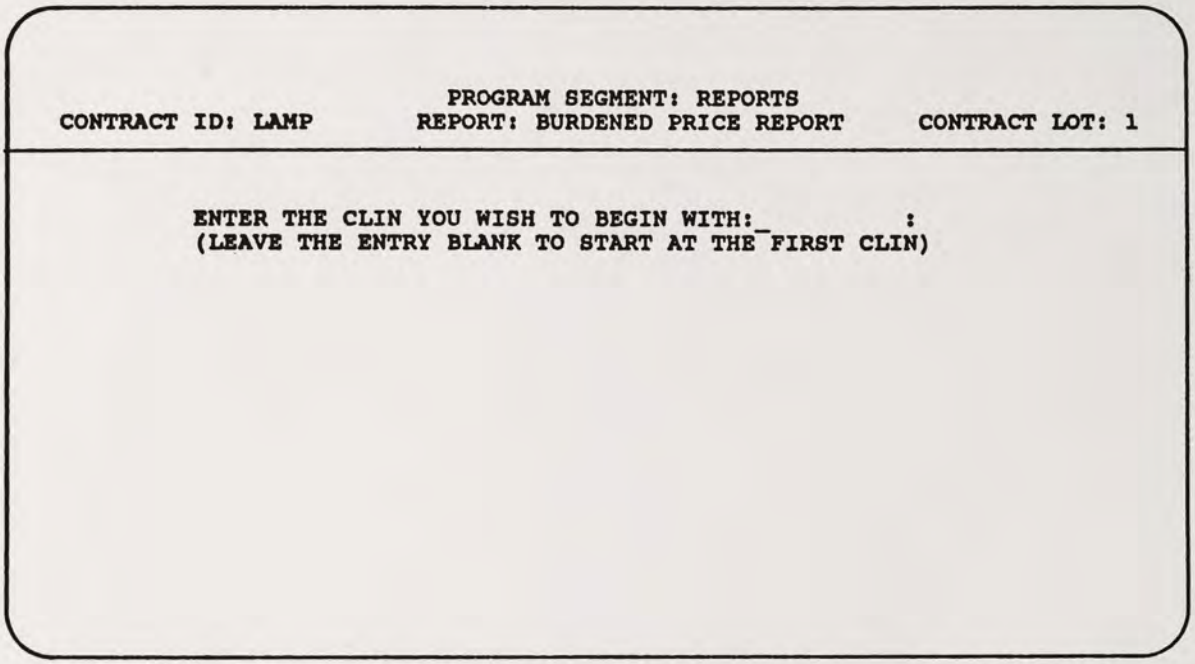


FIGURE 140

you wish to begin with the first CLIN in the file, simply press <return> (leaving the CLIN entry blank). To start with any other CLIN, the actual CLIN must be entered.

If a CLIN is entered that is not located within the CLIN file, an error message will be displayed to the user (Figure 141), the user will be requested to reenter the starting CLIN. If the CLIN is located, proceed to Step 92.

STEP 92: Figure 142 shows the screen displayed when the starting CLIN has been entered and located within the CLIN file. At this time the user may enter the CLIN for which the last burdened price is to be generated. If you wish to produce burdened prices for all of the remaining

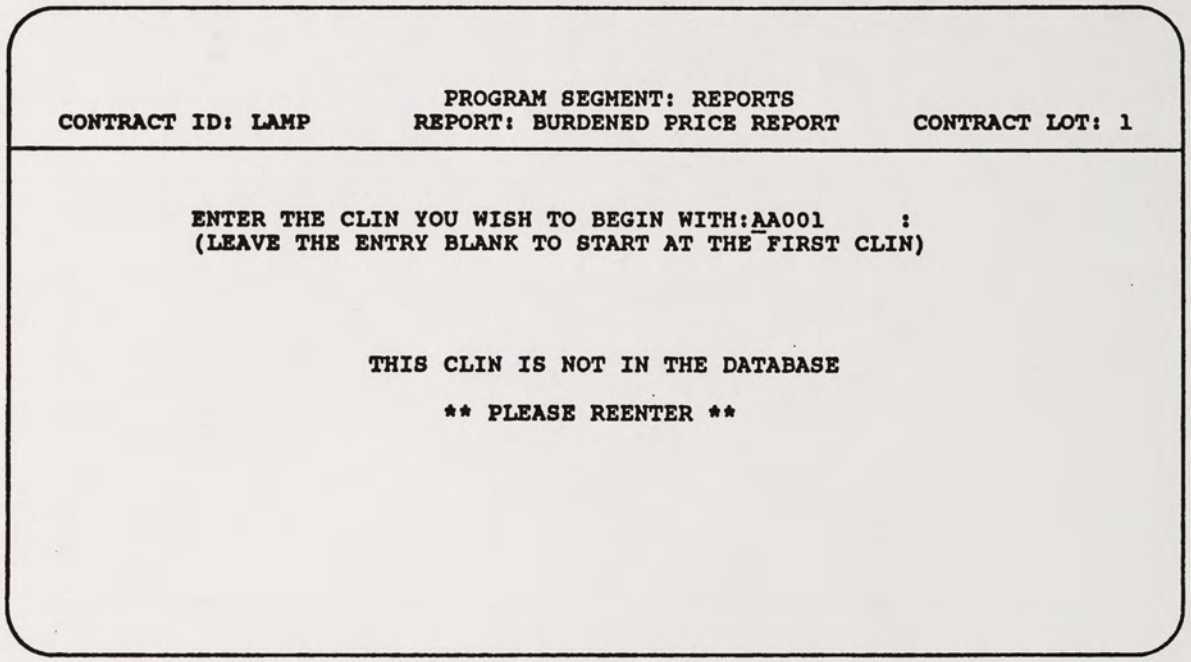


FIGURE 141

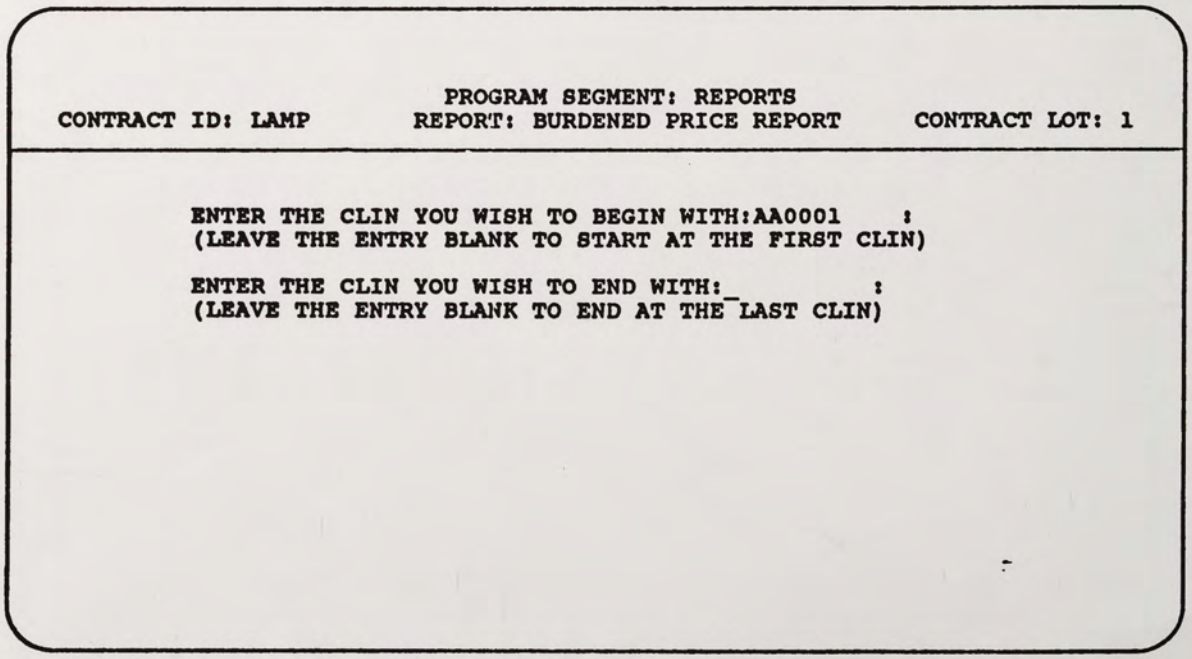


FIGURE 142

CLINs simply press <return> (leaving the ending CLIN entry blank) to produce sheets for the remaining CLINs. To end with any other CLIN, the actual ending CLIN must be entered.

If a CLIN is entered that is not located within the CLIN file, an error message will be displayed to the user similar to that shown in Figure 141, and the user will be requested to reenter the starting CLIN. If the CLIN is located, proceed to Step 93.

STEP 93: Figure 143 shows the screen displayed to the user once the user has entered the starting and ending CLINs or the user has elected to complete the total (burdened) price for the entire lot. At this time the user may select the specific position that he/she wishes to have priced. Enter a 'P' to price the proposed hours/dollars. Enter an 'R' to price the recommended hours/dollars. Enter an 'N' to price the negotiated hours/dollars. Any entry other than 'P', 'R', or 'N' will result in an error message being displayed to the user, and the user will be asked to reenter his/her choice.

STEP 94: Figure 144 is the screen displayed to allow the user to select where the report is to be printed. Return to steps 67 through 70, figures 98 through 105, to complete the actual printing of the burdened pricing reports. While the report is being prepared, status messages will be displayed, allowing the user to know that

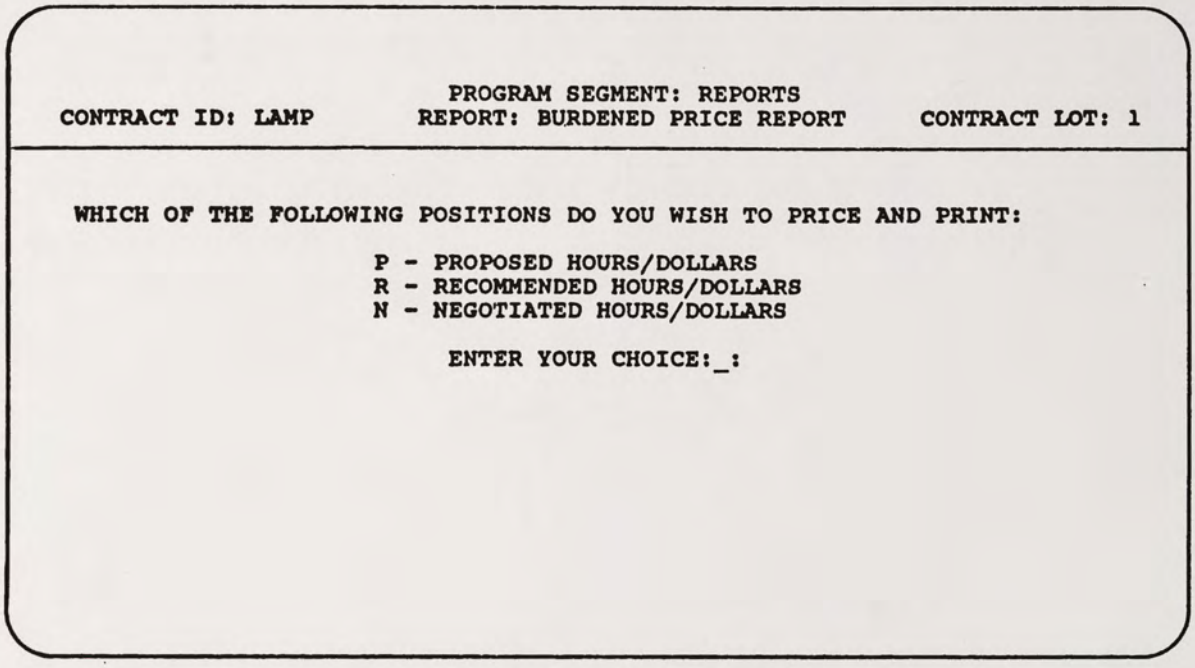


FIGURE 143

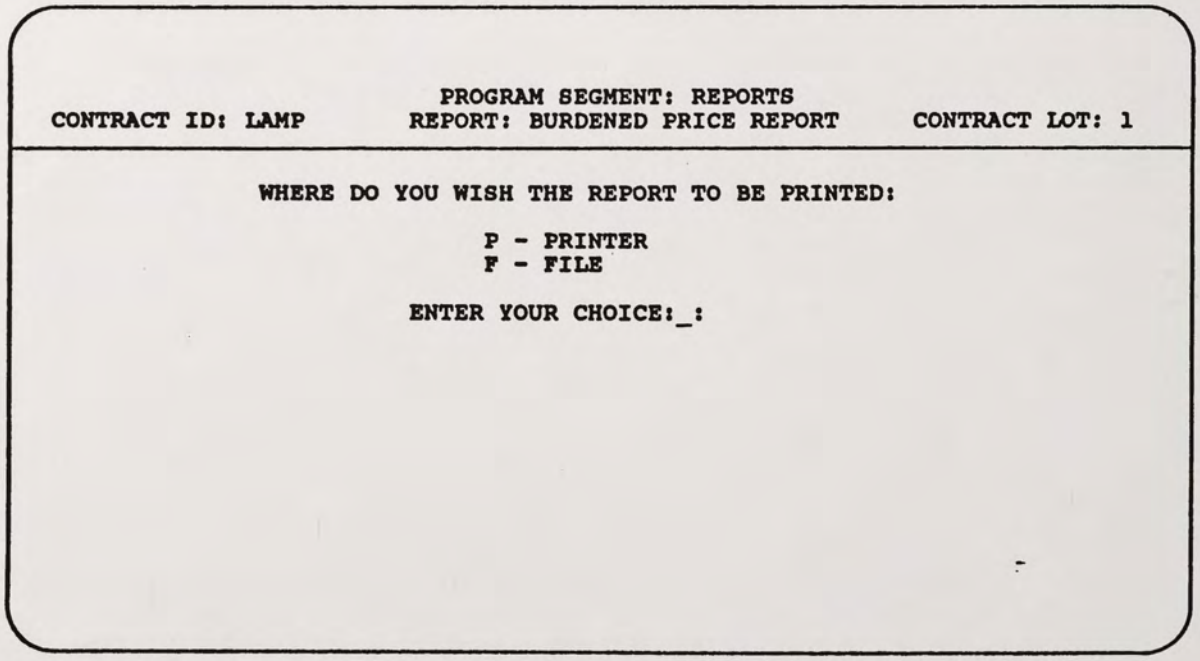


FIGURE 144

the report generation process is underway. (See Figure 145.)

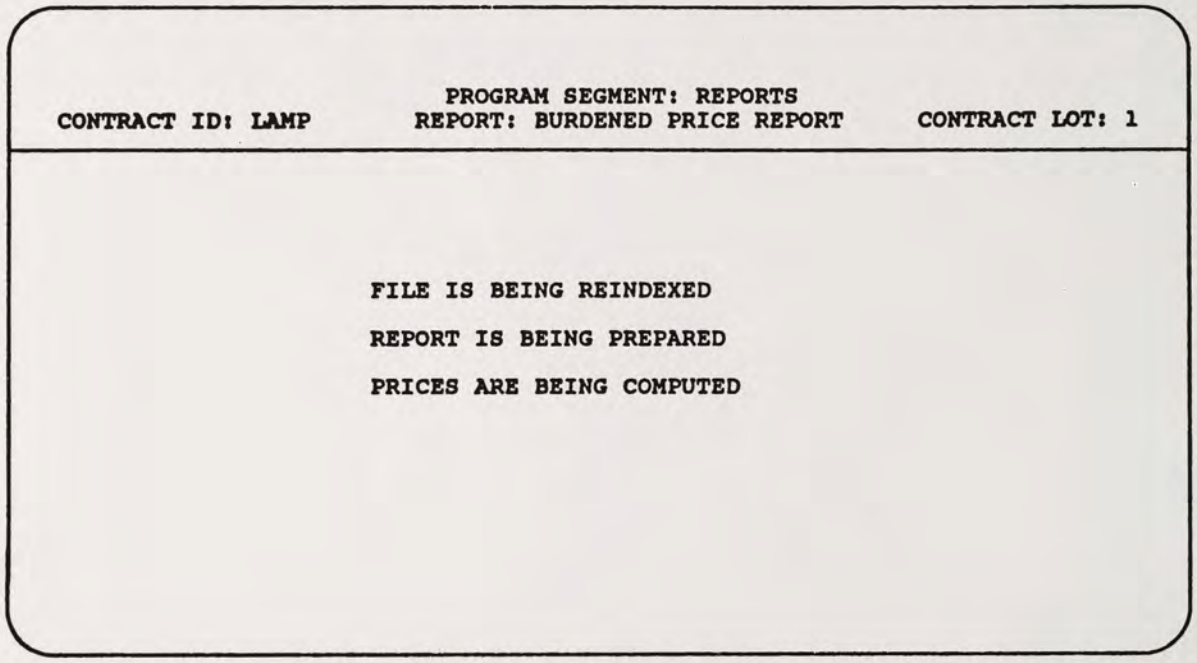


FIGURE 145

An added feature to the printing of the total (burdened) prices by CLIN is shown in Figure 146. While the report is being generated, the start and stop CLINs are displayed to the user, and the actual CLIN being presently printed is shown on the screen. This will allow the user to monitor the progress of the report generation process.

When the report is complete, whether generated for an entire lot or for a specified group of CLINs, a message is displayed to the user (Figure 147), and the user should press <return> to return to the report menu, Step 65, Figure 95.

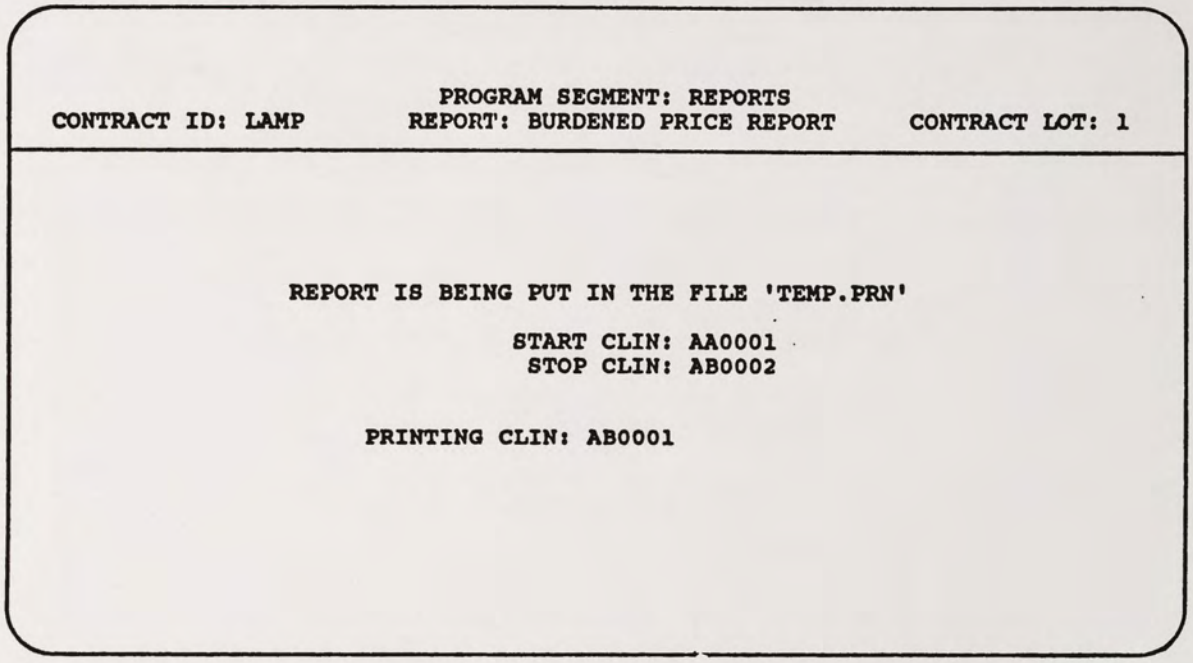


FIGURE 146

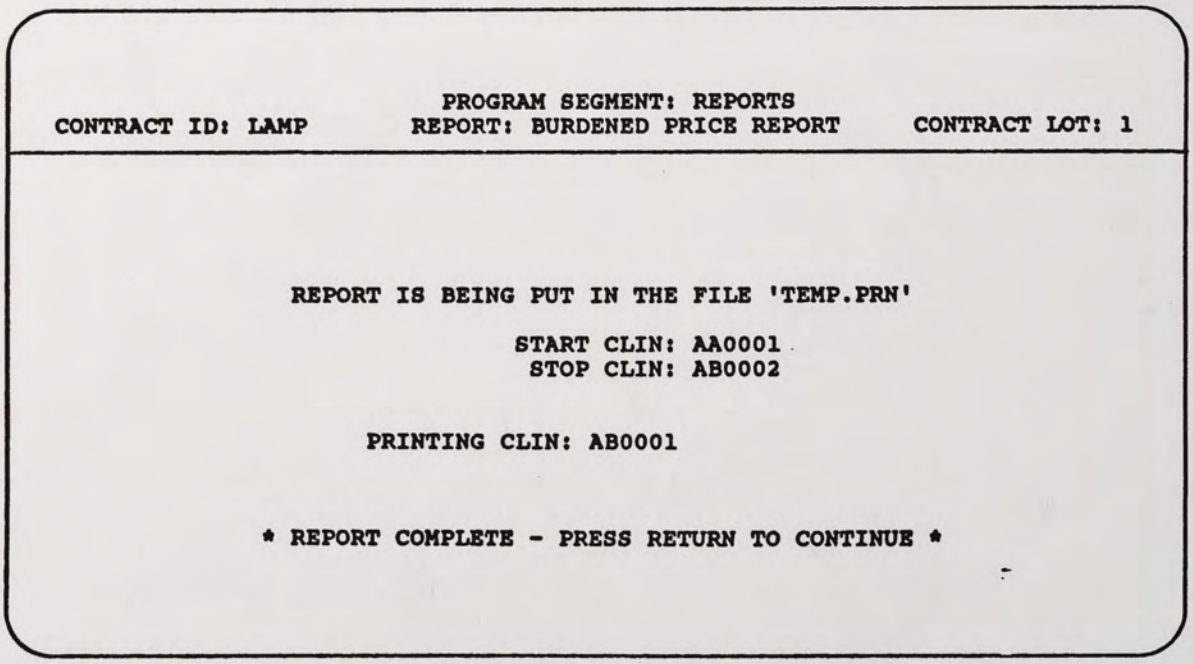


FIGURE 147

SECTION II

HELP

Data File Naming Conventions

Due to the extensive capabilites and flexibilities of SNAP, very strict rules have to be adhered to in the naming of data files to be used by this program. For a given contract and lot, six different data files will be generated, as well as six different index files. This section is included to provide the user with a better understanding of how this program names the data files, and subsequently, how the user must name the files if any preexisting data files are to be used.

The data file names can be broken into four separate components. (See Figure 148.) The first four characters of the file name are directly replaced with the four characters that the user enters as the contract identifier. Should the user enter less than four characters, the space(s) on the end of the contract id will be eliminated.

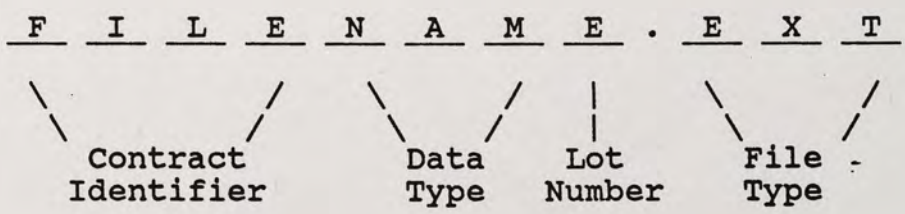


FIGURE 148
FILE NAME COMPOSITION

The characters in positions five through seven are generated internally to the program, and identify what type of data is maintained within the data file. The following represents the coding used in the naming convention:

WBS - includes the WBS numbers, nomenclatures, and CLINs.

CLN - includes the CLINs and their associated nomenclature.

ACT - includes the ACCT numbers, their nomenclature, the hour/dollar identifier, and any applicable labor rates.

DPT - includes the DEPT and their associated nomenclature.

LOT - includes the hours/dollars by WBS, ACCT, and DEPT, both non-recurring and recurring for the proposed, recommended and negotiated positions.

BDN - includes the burden rates, their nomenclature, and all of the ACCT numbers to which the rate is to be applied.

The eighth character of the filename is the lot number that the user enters when utilizing SNAP.

The file extension (i.e., characters nine through eleven), is either 'DBF' to indicate that it is the database file, or 'NDX' to indicate that it is the index for the database file. It should be noted that an index is required for a file and if one doesn't exist, the program will

automatically generate one.

Going through a few examples of this naming convention; 'LAMPLOT1.DBF' is the hours/dollars database file for the lamp contract, lot one. 'BALLWBS3.DBF' is the WBS database file for the ball contract, lot three. 'LAMPDPT2.NDX' is the DEPT index file for the lamp contract, lot two.

Using this naming convention, backing up the files created by SNAP can be done by contract identifier, by lot, or by both, using the appropriate operating system's "wild card" character(s). As an example, in DOS, backup a specific contract by specifing the filename(s) to be backed up as '_ _ _ _ * . *' where the four blanks are used to specify the contract id. Backup a specific contract and lot by specifing the filename(s) to be backed up as '_ _ _ _ ? ? ? _ . *' where the first four blanks are used to specify the contract id and the last blank is used to specify the lot number. These commands, or similar commands in a different operating system, will greatly reduce the complexity of backing up a specific work effort.

Database File Structure

In order for SNAP to operate correctly, a file structure has to specified for each of the database files used. If files are created within the program, this specified structure will automatically be adhered to, and

the user need not concern himself/herself with the actual file structure. However, if a separately maintained and/or created file is to be converted to a file which can be accessed by SNAP, not only must the naming convention conform to that described previously, but the actual database file structure must be exactly as described below:

WBS FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	WBSNUMBER	C	30	0
2	WBSNOMENCL	C	50	0
3	CLINNUMBER	C	10	0

CLN FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	CLINNUMBER	C	10	0
2	CLINNOMEN	C	50	0

ACT FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	ACCTNUMBER	C	5	0
2	ACCTTYPE	C	1	0
3	ACCTNOMEN	C	30	0
4	LABORRATE	N	6	2

DPT FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	DEPTNUMBER	C	5	0
2	DEPTNOMEN	C	30	0

BDN FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	BDNNOMENCL	C	30	0
2	BDNRATE	N	6	4
3	ACCTNUMBER	C	5	0

LOT FILE STRUCTURE

Record#	FIELD_NAME	FIELD_TYPE	FIELD_LEN	FIELD_DEC
1	WBSNUMBER	C	30	0
2	ACCTNUMBER	C	5	0
3	DEPTNUMBER	C	5	0
4	PROPNONREC	N	12	0
5	PROPREC	N	12	0
6	RECMNONREC	N	12	0
7	RECMREC	N	12	0
8	NEGTNONREC	N	12	0
9	NEGTREC	N	12	0

Should an experienced dBASE III PLUS user wish to transfer existing data files into one or more of these specifies file formats, the following information may be useful:

(1) The structure of these files can be found in the 'DBF' files provided with the SNAP system. These files were created using the "COPY TO <database file name> STRUCTURE EXTENDED" command in dBASE III, and can thus be used to create new database files with the same structure by entering the dBASE III command "CREATE <new database file name> FROM <SNAP database file name>". Be sure to adhere to the file naming convention discussed previously in developing the new database file name.

(2) The newly created database file can than be "USE'd" in dBASE III, and the existing data file can be read in with the command "APPEND FROM <existing data file name> TYPE <file type>". The ASCII file types that are presently supported by dBASE III PLUS are "DELIMITED" (i.e., a comma separates the fields and double quotation

marks surround character data), "DELIMITED WITH BLANK" (i.e., fields are separated with one blank), OR "DELIMITED WITH <delimiter>" (i.e., fields are separated with commas and character strings are enclosed with the specified delimiter). Other file types that are supported by dBASE III PLUS are "SDF" (System Data Format), "DIF" (VisiCalc file format), "SYLK" (Multiplan spreadsheet format), and "WKS" (Lotus 1-2-3 spreadsheet format).

(3) Existing dBASE III PLUS database files can be uploaded into the proper database file structure by the dBASE III command "APPEND FROM <database file name>". dBASE II database files can be converted to dBASE III PLUS database files using a conversions program supplied with the dBASE III PLUS software package.

SECTION III

PROGRAM FILE NAMES LISTING

The following files must be present on the disk in order for the SNAP system to work correctly:

Program Files:

SNAP.PRG
FILEEXST.PRG
REPORTS.PRG
WBSPROC.PRG
CLINPROC.PRG
ACCTPROC.PRG
DEPTPROC.PRG
LABRPROC.PRG
BRDNPROC.PRG
LOTPROC.PRG
FILESLCT.PRG
FILEAVAL.PRG
WBS.PRG
CLIN.PRG
ACCT.PRG
DEPT.PRG
LABR.PRG
BRDN.PRG
LOT.PRG

Report Generation Files:

WBS.RPT
ACCT.RPT
LABR.RPT
LOT.RPT
UBDPRICE.RPT
PRINT.RPT
CLIN.RPT
DEPT.RPT
BRDN.RPT
SUM.RPT
BDPRICE.RPT
FILEEXST.RPT

Database File Structure Files:

LOT.DBF
CLN.DBF
DPT.DBF
PRICE.DBF
WBS.DBF
ACT.DBF
BDN.DBF

GLOSSARY

ACCT: Cost Account Number

ADP: Automated Data Processing

CDRL: Contract Data Requirements List

CLIN: Contract Line Item Number

DEPT: Department

MS DOS: Microsoft Disk Operating System

PC DOS: Personnel Computer Disk Operating System

RFP: Request For Proposal

SNAP: Simplify Negotiations with Automated Pricing

STAC: Southern Technology Applications Center

WBS: Work Breakdown Structure

BIBLIOGRAPHY

Air Force Systems Command, "COPPER IMPACT Guidebook: Applications of Automation to Contract Pricing and Finance." DCS/Procurement and Manufacturing, Dayton, Ohio, 1978. (Mimeographed.)

Aston-Tate. Learning and Using dBase III Plus. Torrance, California: Aston-Tate Publishing Group, 1985.

Aston-Tate. Programming With dBase III Plus. Torrance, California: Aston-Tate Publishing Group, 1985.

Awad, Elias M. "Computer Contract Negotiation Pays Off in the Long Run." Data Management 22 (July 1984): 28-30.

Awad, Elias M. Introduction to Computers in Business. Englewood, New Jersey: Prentice-Hall, 1977.

Bentley, Jon Louis. "A Case Study in Writing Efficient Programs". Paper presented to the Office of Naval Research, Pittsburgh, Pennsylvania. (Available from DTIC, Alexandria, Virginia, Report No. ADA127572) 1983.

Bradley, James H. coord. "Directory of Vendors of Simulators, Related Services, and Applicable Computers." Simulation 45 (July 1985): 20-37.

Brouse, C., and Delang, J., User's Manual for Cost Proposal Evaluation Program (CPEP). Orlando, Florida: Science Applications, Inc., 1983.

Brown, Henry C., and Ellis, Donald S. "Defective Pricing: Management Tools for Case Resolution." Thesis, Air Force Institute of Technology, Air University, 1984.

Chandrasekaran, B.; Dillard, J.; Ramakrishna, K. "The Design of an Expert System for Contract Price Analysis." Interim Report for Period 15 July 1983 - 30 September 1983. Columbus, Ohio: Ohio State University (Available from DTIC, Alexandria, Virginia, Report No. ADA140927) 1983.

Crabtree, Donald J. "Contract Pricing Handbook, PMO Tactical Management Information Systems." Thesis, Air Command and Staff College, Air University. (Available from DTIC, Alexandria, Virginia, Report No. ADA156174) 1985.

Danhof, Clarence H. Government Contracting and Technological Change. Washington, D.C.: The Brookings Institute, 1968.

End, Wolfgang; Gotthardt, Horst; and Winkelmann, Rolf. Software Development. Translated by A.J. and B.D. Tebby. New York: John Wiley & Sons, 1983.

Fairley, Richard E. Software Engineering Concepts. New York: McGraw-Hill Book Company, 1985.

Fathi, Eli T., and Armstrong, Cedric V.W. Microcomputer Software Project Mangement. New York: Marcel Dekker, Inc., 1985.

General Electric Company, Mark III COPPER IMPACT Proposal Pricing System. Fairfield, Connecticut: General Electric Company, 1979.

Gilbert, Philip. Software Design and Development. Chicago: Science Research Associates, Inc., 1983.

Gillespie, Allan W., "Automated Pricing System for Hughes Helicopter." U.S. Army Aviation Systems Command, St. Louis, MO., 1984. (Typewritten.)

Gustine, James E.; Mills, John A.; and Thompson, Charles R. "COPPER IMPACT: Computer Technology Applied to Contract Pricing." Group project, Florida Institute of Technology, Orlando, FL, 18 August 1980. (Mimeographed.)

Hanrahan, John D. Government by Contract. New York: W.W. Norton & Company, 1983.

Holtz, Herman. Government Contracts Proposalmanship and Winning Strategies. New York: Plenum Press, 1979.

Jones, Jerry L. Structured Programming Logic: A Flowcharting Approach. Englewood, New Jersey: Prentice-Hall, Inc., 1986.

Loring, Roy J. Proposal Preparation and Management Handbook. New York: Van Nostrand Reinhold, 1982.

National Security Industrial Association. "Event Master - Registrants, Event: IT 6th ITEC Conference." Pubn. EVT310, 1985. (Mimeographed.)

Nelson, Eric. The Analytical Science Corporation, Columbus, Ohio. Interview, 3 Oct 1985.

Pressman, Roger S. Software Engineering A Practitioner's Approach. New York: McGraw-Hill Book Company, 1982.

RCA. PRICE Reference Manual. New York: RCA Price Systems, 1984.

Sarin, R.K.; Sicherman, A.; and Nair, K. "Evaluating Proposals Using Decision Analysis." IEEE Transactions on Systems, Man and Cybernetics. SMC-8 (2 Feb 1978): 128-131.

TLB, Inc. "Solomon-III Job Costing." (Software Package Available from International Software Corp, Fort Collins, CO, Sequence No. 82156830) date unknown.

Turner, Ray. Software Engineering Methodology. Reston, Virginia: Reston Publishing Company, Inc., 1984.

U.S. Department of Defense. Work Breakdown Structures for Defense Materiel Items. Pubn. No. MIL-STD-881A, 1975.

U.S. Department of Navy. Naval Training Equipment Center (NTEC). "NTEC Active and Inactive Contract Status Listing N61339-72." Pubn. No. DCSM87L01, 1 Aug 1985.

Visk, C.R., and Ramamoorthy, C.V., eds. Handbook of Software Engineering. New York: Van Nostrand Reinhold Company, 1984.

Wind-2 Research Inc. "Wind-2 Jobcost." (Software Package Available from International Software Corp, Fort Collins, CO, Sequence No. 86862600) 1983.